

# CHEMICAL MARKETS

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## Taxes

**I**N 1776, the year of our Declaration of Independence, Adam Smith laid down four principles of taxation that in the passing century and a half have been studied by economists and experimented with by statesmen. By every test they have been found just and expedient. These four sound principles are:

*First, Equality:* Citizens ought to contribute toward the support of the Government as nearly as possible proportionately to the income they enjoy under the protection of the state.

*Second, Certainty:* The tax ought to be certain, not arbitrary—the time of payment, the manner of payment, the amount to be paid, ought to be clear and plain to all.

*Third, Convenience:* Every tax ought to be levied at a time and in a manner most likely to be convenient for the taxpayer.

*Fourth, Economy:* Every tax ought to be so contrived as both to take out and to keep out of the pockets of the people as little as possible, over and above that which it brings to the public treasury.

**O**UR present federal system of income and profit taxes presents the stupendous anomaly of ignoring three out of four of these sound principles of taxation.

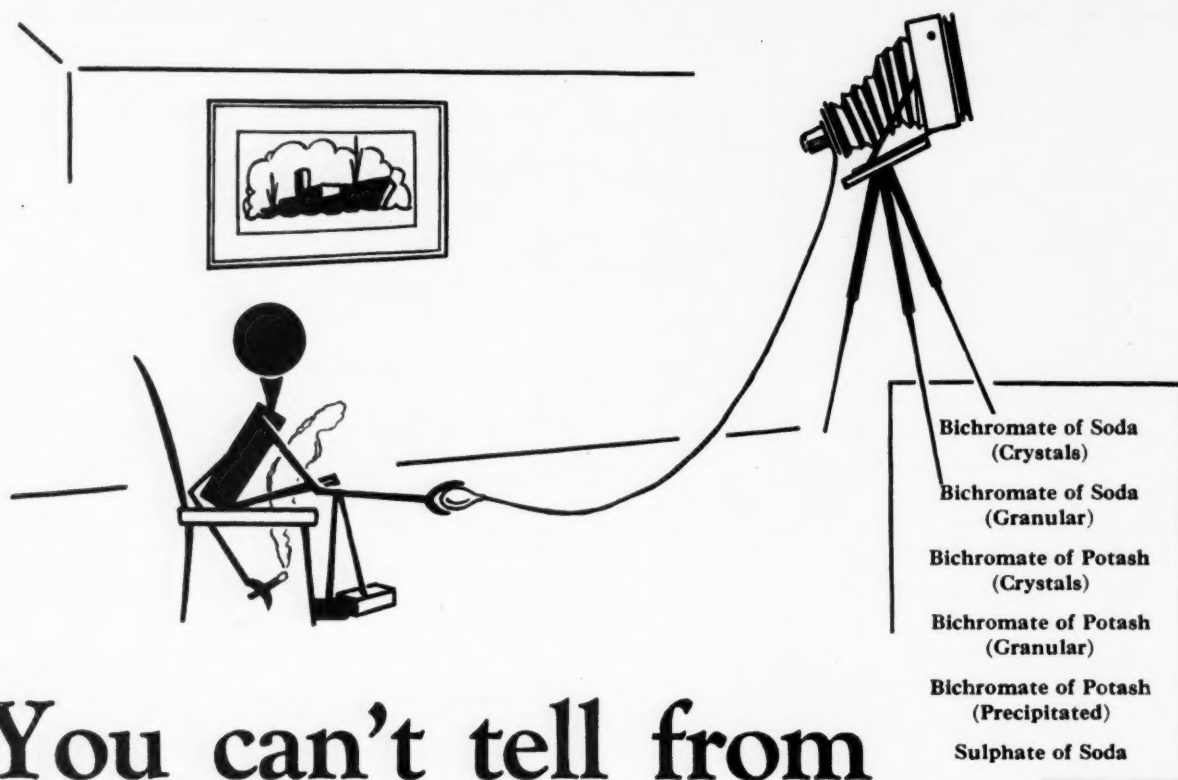
**E**QUALITY—though ostensibly graduated the present tax is paid by but one person in thirty; the provisions covering “earned income” are a farce insofar as really distinguishing for relief money received for actual work done;

those best able to pay, the very rich, especially the idle rich, by establishing losses and controlling the source of their income are able largely to avoid the tax.

**C**ERTAINTY—Under the present Treasury Department administration cash refunds have totalled roughly a billion and a half dollars and the back taxes collected reach the astonishing sum of over seven billions; every revision of the law has resulted in increasing confusion and on several occasions important provisions have been made retroactive; regulations have been issued at variance with the law and in nullification of court decrees.

**E**CONOMY—Until the last two years the tax has provided more income than needed to run the Government and Congress instead of admitting the over-taxing of the past has posed as a generous benefactor in reducing the rates. The complexity of the law and regulations require much clerical work on the part of the Government that a simple system would discharge, while they have created a whole army of tax experts whose services are freely employed by taxpayers at sizable fees.

**L**ARGER taxes must be levied. Surely this is the right time to go to the root of this serious matter and revise a system so unfair, so unwise, and wasteful.



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## **Stockholders' Interests**

We have made the down swing of the business cycle before; but the past eighteen months have brought a unique experience to even our senior executives. For the first time in the midst of depression the rights and the interests of outside stockholders have had to be considered. For the first time, the pitiless public appraisal of the stock exchanges has had to be reckoned with. Formerly, the captains of our chemical fleet could batten down the hatches, reef the sails and ride out the hurricane with sole purpose of salvaging ship and cargo. To the crew, which seemed almost to belong to the ship, there have now been added passengers; a confused, helpless, panicky band whose lives and baggage are a serious added responsibility.

The nautical simile is apt: not only because there is today many a chemical executive who finds himself in the position of the salty skipper of a weather-beaten tramp placed in command of a smart liner; but also because it suggests naturally a recent specific instance in which the interests of stockholders have been held to be above the judgement of the management as to what were the best interests of the company. That was the inner essence of the Kyslant case. The point at law was a fine one, hanging on the statement in a prospectus that the British steamship company's net earnings over ten years were five times over the interest requirements of the debentures offered. This was a fact. Lord Kyslant, responsible executive of the company, was found guilty because that statement of fact did not reveal the second and pertinent fact that most of these profits had been earned during the early booming years of the last decade.

The swift trial and certain imprisonment of a man of Lord Kyslant's position and wealth upon so fine a point is in brilliant contrast to the delays and uncertainties that darken American courts, and it is so easy to draw invidious comparisons that a broader significance of this conviction is easily overlooked.

The wide diffusion of corporation stocks creates a situation which is perplexing to our executives because it is very new in chemical industries and but illy defined even in fields where public ownership with minority control of affairs is better established. Ordinarily the scattered ownership is indifferent and voiceless: once aroused, usually by fear or greed, it is apt to be panicky and spiteful. Better definition of the rights of management and of the responsibility of owners is very necessary and will come only after legal battles parallel to the labor-capital struggles of the

pre-war era. Our corporation laws are drafted in theory to protect the rights of the minority stockholders; but there is much variation from state to state which adds to the confusion.

Already sulfur and solvents have been involved in questions of conflicting interests within important producing companies, while heavy chemicals and paints have witnessed behind closed doors sharp struggles for company control. This brings the matter close to home, and indicates plainly how different a matter it is—quite aside from any question of honesty or of competence—to run a family-owned or closely held chemical operation than to administer a chemical enterprise whose voting shares are widely owned and publicly traded.

## **After the Census; the Imports**

If any American dye manufacturers believed that the discontinuance of the Dye Census was going to profit them, their nearsighted selfishness is due for a rude shock. It will not be long now before a diplomatic representative of foreign dye-making interests will be whispering into certain willing Congressional ears that, the Tariff Commission having seen fit to withdraw from publication the vital statistics of our domestic dye industry, to collect and disseminate detailed information on our dye imports is unfair to the interests of our good American dye importing houses; that it certainly is rendering a special service to one branch of a single American industry; that it is quite an expense to the Government. Three appealing reasons these, which will reach quite different intellects and touch quite a number of pocketbooks.

**Bosch-Bergius** Scientific acknowledgment for his work again comes to Carl Bosch with his selection to share the latest Nobel prize for chemistry with Friedrich Bergius. After Haber's investigations of the nitrogen, hydrogen, ammonia equilibria during the years 1904 to 1910 began to take shape, the Badische Company aimed to develop a commercially practical nitrogen fixation process from these researches. The resourceful Bosch devised a sufficiently cheap manufacturing method for hydrogen, and in 1913 the first Oppau plant began operations at a rate of about eight thousand tons of nitrogen annually. Great obstacles were surmounted in commercializing operations at 500 degrees Centigrade and about four thousand pounds pressure per square inch, long before tensile

strength, and corrosion, and heat resistance could be built into alloys almost on specification but from these technological triumphs of Dr. Bosch has sprung the most important industrial chemical development since the war, and it is a curious coincidence that the very year of the expected nitrogen surplus should be marked by this award. It is a curious anomaly that coupled with Carl Bosch in this Noble prize should be Dr. Bergius whose best advertised scientific accomplishment is as yet almost barren of commercial results. Possibly this year will also mark the beginning of industrial hydrogenation.

### **Curing Sick Industries**

Last month witnessed memorable attempts to prescribe remedies for three important, ailing industries—coal, fertilizer, and naval stores. After the blah-blah is abstracted from the addresses and discussions, formal and otherwise, it is plain that in each case the problem is one of controlling production to somewhere near actual consumption.

Meddling with the law of supply and demand is apt to bring on greater complications, more hardship, and greater damage. But production can be maintained in a satisfactory relationship to consumption in more than one way. Increasing consumption is the most effective and most likely to succeed. Does anyone suggest seriously that a saturation point has been reached in the use of coal, fertilizers, or naval stores?

### **Quotation Marks**

There is bound to be a bottom price. This applies to any commodity, and at this time we are thinking chiefly of chemicals. We have talked to many men in the chemical industry,—men who are interested in the plastic industry—and we have made a careful study of present trends and prices. Only one thing is certain; regardless of whether or not certain chemicals have hit their bottom price, the increasing demand for these products in old and new applications will result in definite improvements in manufacture. These improvements may mean an even lower cost of chemicals or they may mean a much greater cost. The decision, one way or another, is dependent upon the scope and adaptability of the chemical.

Yet to an outsider, the increased vision of the chemical man at this time should teach an important lesson. It is a fact that surplus stock does not mean price reduction, but a lowering of manufacturing

costs and an increased selling effort. Thus does the chemical executive, if he is a sound executive, base his price on expanding markets and not on competition.—*Plastics*.

In every well conducted business, there are certain charges that have long been considered as unescapable. Included are interest on borrowed capital, rents, taxes, insurance, depreciation, obsolescence. It is time, in this industrial age, that there be added to these fixed charges a charge for an adequate and sustained program of research, without which no industry can progress, if indeed it can long survive. Dr. L. V. Redman's Grasselli Medal address.

There is little nourishment in speculation on what recommendation the President's Muscle Shoals Commission would have made if Muscle Shoals had not long been more a political problem than an economic problem. That body suggests private operation, preferably by a "corporation exclusively owned and controlled by organizations of farmers." The reasons for private operation are clear and imperative; operation by farmer-controlled organizations can be favored only for the sake of political expediency. There is not the slightest ground for supposing that any cumbersome, topheavy aggregation of farmers can be expected to run the plants at Muscle Shoals as economically and efficiently as they could be operated by a first-rate industrial corporation.—*N. Y. Sun*.

One cannot help asking how long the chemist can continue successfully to develop new methods of manufacturing new and old products in a world which even in normal times seems to be ridden by overproduction in most fields.

In dealing with its supply of raw materials, industry is striving zealously to rid itself of restrictions imposed by geographic locations. A noteworthy illustration is that the synthetic-ammonia process has broken Chile's monopoly so thoroughly that the plants erected in most civilized countries during the past decade would be capable today of supplying the world's entire demand for fixed nitrogen.—*Dr. Per Frolich, Standard Oil Co. of N. J.*

### **Fifteen Years Ago**

(From our issue of December 1916)

Tennessee Copper reorganized as the Tennessee Copper and Chemical Co. with Adolph Lewishon, president.

DuPont declares regular quarterly dividend of 1½% together with special dividend of 24½%, both payable in cash.

Secretary of War calls attention to complete dependence of United States on Chilean nitrate. A \$20,000,000 government plant is proposed.

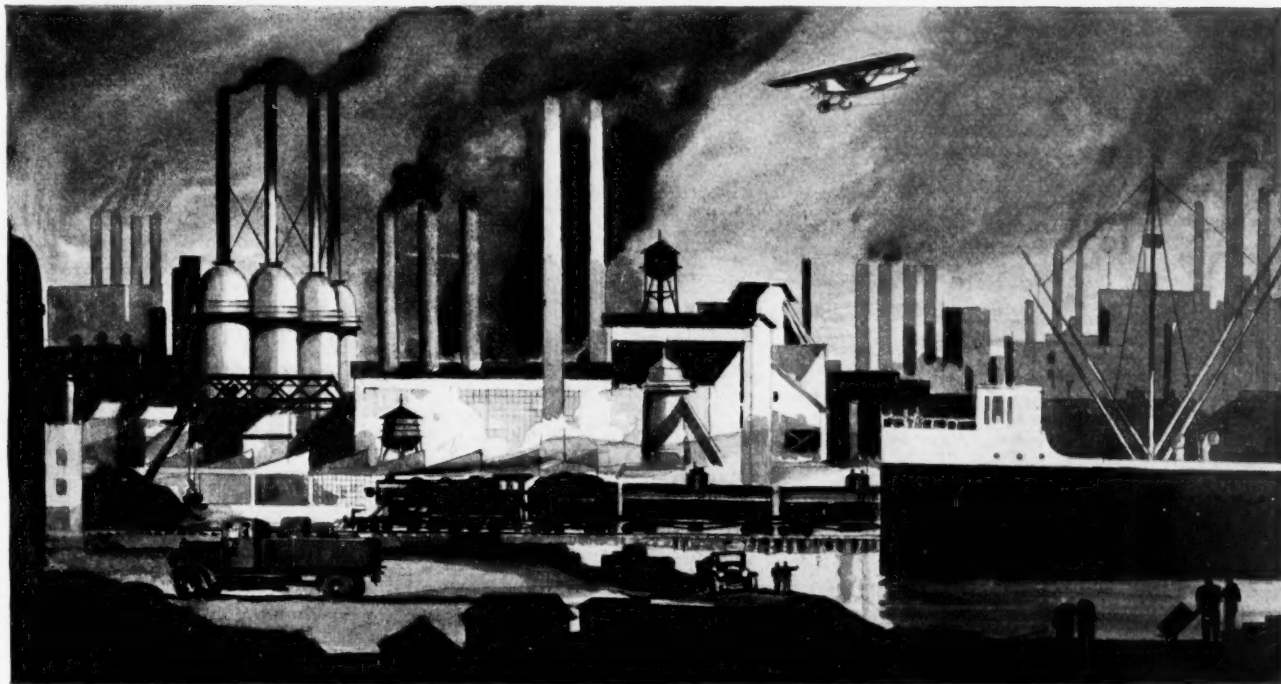
Monroe Color and Chemical starts a dye plant at Quincy, Ill.

Dow Chemical brings suit against A. E. Schaeffer to prevent use of secret process for bromine manufacture.

Virginia-Carolina Chemical and James B. Duke acquire stock interest in American Cyanamid.

# Forerunners of the Present Depression\*

By Dr. Ernest L. Bogart  
President, American Economic Association



**Out of the pains of liquidation and readjustment of past depressions we have reached still greater heights of industrial achievement**

THE other day an acquaintance stopped me on the street and asked if I thought that we would never recover from the present depression but would have to adjust ourselves permanently to conditions of lowered production and of chronic unemployment. A banker said to me recently that the present crisis is the worst in our history and prophesied that it would probably take thirty years to restore prosperity. It may be, as our richest citizen has asserted, that "history is bunk," but a slight knowledge of our own economic development would have saved these gentlemen from much foolish talk. Indeed, one can derive a great deal of comfort from a study of the past, for the United States in the last hundred years has experienced some fifteen well-marked crises, from each of which the country has emerged, after a period of depression varying from a few months to five years, stronger and more prosperous than ever. While history never absolutely repeats

itself, even a brief survey of some of the more important crises of the past will throw needed light upon our present plight. For this purpose I shall select those of 1837, 1873, and 1893, since these were the most serious and were followed by the longest depressions.

Within the last twenty years the term "business cycle" has come into general use to describe these recurrent circles of good times, speculation, and depression, and it is to this cycle that I wish to direct your attention. In every case we have gone ahead too fast in the investment of capital in fixed forms, far in advance of the immediate needs of the country, and then have been compelled to pause and catch our breath.

The crisis of 1837 was preceded by the construction on a large scale of internal improvements in the form of turnpikes, steamboats, canals, and banks, which were designed to connect the vast region between the Appalachian Mountains and the Atlantic seaboard, to open up new markets both for the western farmer and

\*Opening address in Economic Series sponsored by National Advisory Council on Radio in Education. Abstracted from "Economic Aspects of the Depression", Univ. of Chicago Press.

for the eastern manufacturer, and to provide credit facilities for larger domestic trade. Difficult as it is for us to realize today, the opening of the Erie Canal was more immediately revolutionary than were the later railroad or automobile developments. Its effect on domestic commerce was phenomenal. Freight rates between New York and Buffalo were cut to one-tenth the former figure and the time for the trip was shortened from twenty to eight days.

A stream of settlers and freight began to move into the Ohio Valley, and a return movement of western produce flowed to the Atlantic coast cities. The South, too, prospered; she bought food and other supplies from the western farmers, and manufactures from eastern merchants, to whom she sold her expanding cotton production. All sections of the country shared in the new prosperity which was introduced by the revolutionary changes in transportation. It seemed as if the key to unbounded wealth had been found.

The response of the people was immediate and unmistakable. With one accord they gave themselves to speculation. It was a period of rapid change, of great economic development, and of unbounded optimism. A network of canals, 4,500 miles in all, was built—far more than the traffic could support. Steamboats multiplied in number on the Mississippi River and the Great Lakes, and throughout the West and South hundreds of private and state banks were chartered to provide the credit facilities for the expected expansion. Within a decade perhaps half a billion dollars had been invested in internal improvements, much of which was borrowed from Europe. The inflation of the currency caused higher prices, and the "new era" of good times was hailed as permanent.

#### Severity of the 1837 Crisis

In 1837 this period of expansion and speculation came to an end. The premature investments could not earn their interest charges. Depression in England curtailed the foreign demand for cotton, and in March several of the greatest cotton factors in New Orleans failed. Cotton fell from twenty cents a pound to ten. In New York 130 firms had failed by the middle of April. In May every bank in the United States suspended specie payments. Over six hundred banks failed, the discredited bank notes depreciated in value, and prices shrank to a hard-money level. When foreign investors asked for the repayment of their loans, some of the states repudiated their bonds and others delayed their interest payments. Several of the western states declared a moratorium on private debts. The government revenues fell off and Congress, called in extra session, voted \$10,000,000 in Treasury notes to meet the emergency.

The crisis of 1837 was followed by a prolonged depression. Factories and workshops, organized on a

boom basis, closed when the demand fell off. Thousands of operatives were discharged, and the cities were filled with the unemployed. Poorhouses everywhere were crowded. Several commission houses were broken into by the unemployed, and the food riots were ended only by the promise of the merchants to give flour to the poor. It was estimated that nine-tenths of all the eastern factories were closed, while the reduction in the number of clerks in mercantile establishments and banks still further swelled the group of the unemployed.

#### Building Anew on Firm Foundation

This crisis of 1837 was one of the most severe and far-reaching in our history, and the depression did not come to an end until 1842. By that time, however, the effects of the earlier excesses had been overcome, weak institutions had been weeded out, and the necessary readjustments to new conditions of transportation and trade effected. Upon the firm foundation thus laid the natural buoyancy of the people soon built up a more enduring structure of prosperity than any of the country had yet seen. So great was the economic development that the fifteen-year period after 1842 has usually been referred to as the "golden age" of our history.

The crisis of 1873 was the result of a too rapid and too uneven expansion. This time there was an over-investment in farms and railroads. The Homestead Act, which gave to each settler a free farm of 160 acres, proved an irresistible attraction and drew thousands of farmers onto the western plains. These pioneers, anxious to improve their new farms, borrowed from eastern capitalists, mortgaging their lands to them. But many of them borrowed for equipment and improvement more than their farms could earn, and they frequently defaulted on interest and principal. For years "a Kansas mortgage" was a synonym for an unprofitable investment.

Even larger amounts of capital were invested in railroads, which were often built in advance of traffic and beyond the frontier of settlement. Between 1865 and 1873 the railway mileage was doubled. It is difficult today to understand how the builders could have hoped that these railways would develop traffic or earn expenses.

In the cities, factories, docks, and buildings were being constructed on an unprecedented scale. There was in all these ways an enormous absorption of circulating capital in fixed forms, many of which were not immediately remunerative. The equipment for future production along certain lines was increasing at a more rapid rate than the demand. It has been estimated that in the eight years preceding 1873 the capital invested in the United States was equal to the cost of the Civil War.

Not only was much of this expansion unwise and premature, but it was unfortunately attended by

fraudulent practices. These were the days of Erie and *Credit Mobilier*, of the "salary grab" law by Congress, of whiskey frauds, of the infamous Tweed ring, and of other scandals. It was a period of unbridled individualism and of great opportunity, in which speculative excesses were restrained neither by an informed public opinion nor by a high business morality. Waste and extravagance, stimulated by an inflated currency, were seen on every hand. Conservatism in business and economy in private expenditure were disregarded in favor of so-called progressive methods. It was at this time that the phrase "frenzied finance" was added to the American vocabulary.

In September, 1873, the bubble of speculative enterprise and inflated credit burst, and a severe crisis occurred. The immediate occasion of the crash was the failure of the banking house of Jay Cooke and Company, which was heavily involved in the financing of the Northern Pacific Railroad, but an end must soon have come to the speculative expansion in any case. The news of the failure precipitated a panic in Wall Street. Securities were dumped on the market in large amounts and sold for what they would bring. Prices fell disastrously and many brokerage houses and banks failed. The Stock Exchange closed for ten days. A run on the banks started and the eastern banks suspended specie payments for forty days. Commodity prices fell, but buying power fell faster. In the single year 1873 over five thousand failures occurred with liabilities of \$250,000,000. Factories, furnaces, and mills shut down, railroad building stopped, business houses were closed, and three million men were thrown out of work. A depression ensued which lasted for half a decade.

The inevitable period of liquidation and readjustment was severe and protracted. By the end of 1875 railroads had defaulted on \$750,000,000 worth of bonds. A cut of 10 per cent in railway wages in 1877 was followed by strikes, riotous outbreaks, and the destruction of property. It was estimated in October of that year that in the previous twenty months there had been a shrinkage of 25 per cent in the capital employed in mercantile business.

By 1878, however, the depression had run its course, the necessary liquidation had been completed, and the country had entered upon a new period of prosperity. The great investment in railroads and other property improvements, premature though they were, had furnished the country with excellent transportation facilities and industrial plants, and these now contributed to the production of new wealth. After 1879 the standard of living was raised, without straining the resources of the country, to levels which would have been regarded as extravagant and wasteful in 1873.

In describing the crisis of 1893 it is scarcely necessary to recount the now familiar cycle of good times, overexpansion, panic, and depression. I may, however, mention one or two factors not hitherto empha-

sized. The first of these was the great overproduction of farm products, especially of wheat, and the consequent fall in prices. The rapid settlement of the public domain and the introduction of improved farm machinery resulted in the production of crops beyond the capacity of the domestic market to absorb, and whose export glutted the world-markets. Corn was so cheap that it was burned for fuel in many places, and wheat was left unharvested or fed to the stock. The agricultural overproduction and consequent depression adversely affected the railroads, banks, manufactures, and business in general.

A second feature making for maladjustment was the rapid exploitation of our mineral resources and the development of our great iron and steel industries. It was during this period that Jay Gould discovered that pig-iron production was the barometer of trade, but the fluctuations of the barometer unhappily introduced new elements of industrial instability.

Still a third factor was the currency disturbances, brought about by the efforts of Congress to force unneeded amounts of silver upon the country, and resulting in inflation, export of gold, and distrust.

The development before 1893 had been uneven and extreme, and the panic of that year had long been brewing. It was attended by banking and commercial failures, railroad bankruptcies, falling prices, reduced earnings, wage cuts, unemployment, strikes, distress, and unrest. A depression followed which continued until 1896, after which a revival of prosperity occurred which carried the nation to the highest standards of living yet enjoyed.

What shall we say of the crisis of 1929 and the subsequent depression? We are now in the trough and experiencing the pains of liquidation and readjustment but no one familiar with past panics can doubt that the cycle will again run its course and that we shall once more enjoy a greater prosperity. This is the lesson of history.

## Company Booklets

Diamond Alkali, Pittsburg, four page leaflet—one of the series describing various phases of Diamond service and quality.

Mallinckrodt Chemical, St. Louis, released November Price List.

Monsanto Chemical, St. Louis, mailed, "How Monsanto Serves" an elaborate picturization of how Monsanto products, 200 strong, serve 50 diversified industries throughout the 24 hours.

Philadelphia Quartz, Philadelphia, issued new booklet on miscellaneous cleansing operations with "Metso" sodium metasilicate.

R & H, Empire State Building, N. Y. City, released 28 page booklet, a complete treatise on carbon tetrachloride, properties and uses.

Rolls Chemical, Buffalo, "A Romance of the Old South"—a word picture of America's pioneer industry—naval stores.

Rossville Alcohol, Lawrenceburg, Ind., No. 82 in the series of Rossville Alcohol Talks deals with the synthetic yarn industry.

Thompson-Hayward Chemical, Kansas City, "The Test Tube." House organ revived and improved:

## "And in Those Days, Giants Roamed the Earth"

**T**WO splendid giants of the past age of chemical industry, William H. Nichols and Herbert H. Dow, have within recent memory been gathered to their fathers, and their passing has emphasized what the writers of magazine articles and Wall Street forecasts delight to call "the new era in our chemical field". They represented the individual chemical proprietors who built up great manufacturing enterprises which we see amalgamated into the great chemical mergers of yesterday and tomorrow.

But even more recently there has passed along a Titan of what seems now to be a prehistoric period of our chemical history.

For "Borax" Smith is dead.

With him has passed a great representative of the time when American chemical industry was a great, careless exploiter of raw materials, dominating world markets in potash (then literally pot-ashes) of turpentine, of methanol (then only known as wood alcohol) of raw phosphate rock, and of the borax, which he himself exploited and which gave him his nickname known the world over.

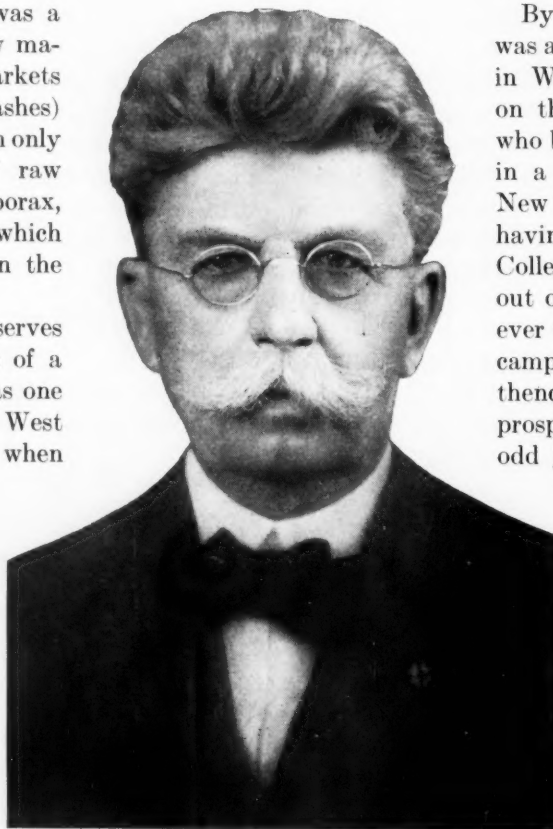
So epic a figure surely deserves more than the passing notice of a formal obituary notice. Yet as one of his close associates in the West End Chemical Company wrote when he forwarded a pile of data and photographs out of which this article has been largely written: "Such an account cannot, of course, even faintly portray the color and picturesqueness of the man's life. He was typical of that group of pioneers who opened the West and carved great new industries out of barren wastes. These men had

brains to think with and energy to do with. They could dream dreams and they possessed those rarer qualities that make dreams come true. Their accomplishments, their ruggedness of character and their indomitable will that persevered in spite of all obstacles are all too often lost sight of by a generation that admires lesser qualities—adroitness, finesse, "slickness"—in its business leaders. Few indeed of our modern captains can boast of lives so crowded with action and so bright with achievement as that of Mr. Smith. The fact that his personal fortune slipped away in his old age in no way detracts from the structures which he had the vision to imagine and the courage and intelligence to build."

It is a true and fitting tribute from one who knew him well.

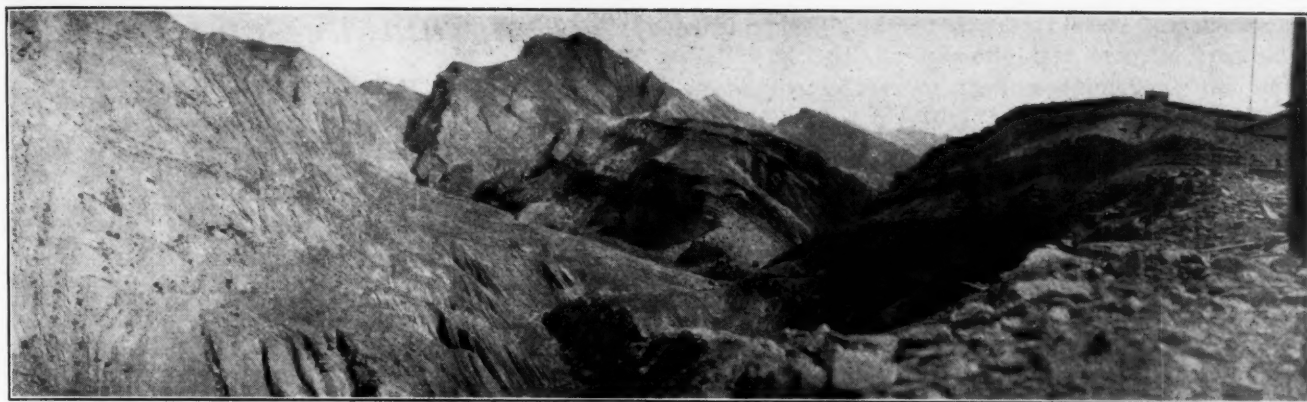
By birth, Francis Marion Smith was a true pioneer, having been born in Wisconsin, February 2nd, 1846, on the homestead farm of parents who but the year before had trekked in a covered wagon from western New York. Twenty-one years later, having been graduated from Milton College, young Smith himself set out on the Overland Trail, working ever westward, following the mining camps from Montana to Idaho and thence on to Nevada and California, prospecting one season, working at odd jobs the next to earn a grub-stake for the next season's hunt for pay dirt.

While cutting timber at Columbus, Nevada, in 1872, he discovered the Teel's Marsh borax deposit. At that time borax was employed chiefly as a drug and sold for forty cents a pound. After surmounting difficulties that would have broken the heart of two ordinary men he succeeded



F. M. "Borax" Smith

Chemical Markets



in acquiring virtual control of the then existing borax supply. His rise was meteoric. He organized the Pacific Coast Borax Company and became its first president. He directed the unique development of the commercial possibilities of Death Valley, pioneered the introduction of improved mining and subsequent treatment processes, and extended the uses of borax in manufacturing and the arts.

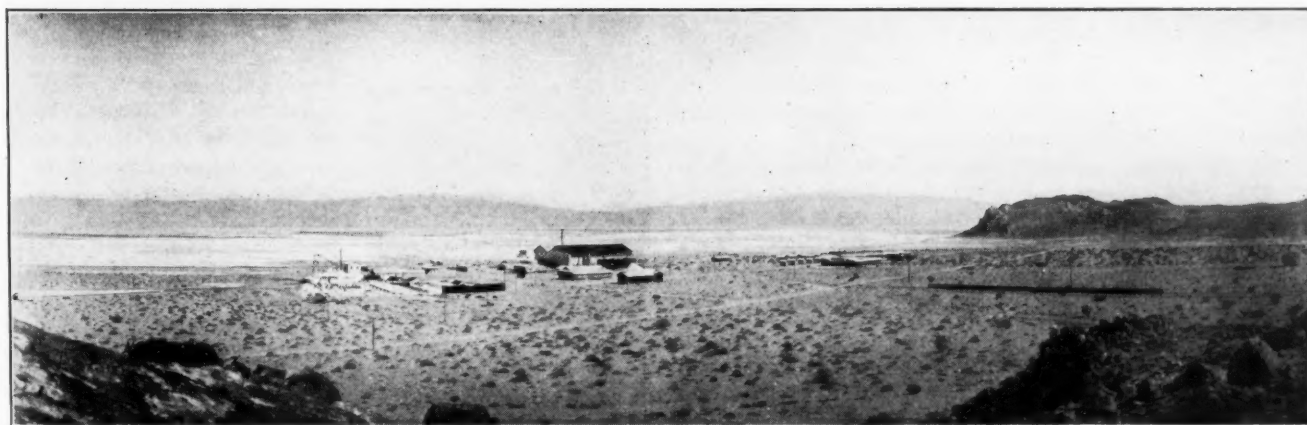
"Borax" Smith sat upon a throne of a financial kingdom \$20,000,000 strong—a kingdom carved from the blistering salt desert. Borax King, Master of the famous Twenty Mule Team, and respected alike in the offices of the nation's financial leaders and in the lowliest of kitchens. But the restless energy that discovered the possibilities in Death Valley would not countenance inaction. Mr. Smith built the most beautiful home in Oakland, California; filled it with a rare collection of paintings. His private yacht was a floating palace, and he won the King Edward VII cup with his sloop "Effort" in the national race sailed August 19, 1906 off Newport. He endowed the Mary R. Smith Trust Fund, named for his first wife, which maintains homes for friendless girls. As a publisher he employed Jack London, Peter B. Kyne and other equally famous journalists and writers. But still he remained restless. "Borax" Smith became a traction magnate and a developer of large Oakland tracts for industrial, commercial and residential purposes. Smith's traction and realty kingdoms crashed about

him in rapid succession. He stood in the bankruptcy court at Los Angeles an abject, pathetic, but still an undaunted indomitable figure. In the crash he lost control of his borax properties to an unfriendly British syndicate.

Stripped of his fortune he set boldly to work to regain his losses. In 1921 he heard of a new borax deposit in Nevada. At the ripe old age of seventy-five years, when most men are complacently viewing life from a comfortable armchair, "Borax" Smith made a spectacular dash back to the land of his youth and power. A fast trip to the rim of the desert by automobile, a wild leap into the saddle, a dash of a hundred miles, and he outwitted a number of San Francisco and Salt Lake interests. Once more the financial crown seemed within his grasp. He had returned from "Elba" but "St. Helena" was but a short distance away. Again financial matters and internal dissension rose to smite him. Once more poverty came—but never oblivion.

"Borax" Smith is physically dead but the glamor and romance of the man will grow with the years as long as the West is the West. Chemical industry has lost one of its most colorful personalities.

Offices prepared by interior decorators have supplanted Smith's rude desert hut. Directorates representing huge financial combinations now render weighty decisions on matters that Smith and his kind made alone, fortified by first hand experience and



*View of borax and soda ash works at Searles Lake, property of West End Chemical Company, one of "Borax" Smith's several ventures in the borax industry. Above, Death Valley, blistering valley of death from which Smith, with his famous "Twenty Mule Team" won a fortune only to lose it in the center of civilization*

shrewdness. "The old order changeth". Undoubtedly the new is more highly organized, but how dull, unromantic, and uninteresting it appears by comparison.

## Foreign News

Dyes held center of attention in English chemical circles in November. Sir Philip Cunliffe-Lister, National Cabinet member moved, Nov. 13, to continue dye restriction measure until Jan. 15, 1932. Little opposition is expected.

Act prohibits importation, except under license issued by Board of Trade, of all synthetic organic dyestuffs, colors, and coloring matters and all organic intermediate products. Under revised ruling adopted Jan. 1931, import licenses will be granted if British makers are not willing to supply dyestuffs at foreign prices, provided these are not "dumping" prices.

Rumors report Imperial Industries ready to join forces with German Dye Trust and French Kuhlmann in mammoth dye cartel controlling 60 per cent of the world's dye production. Present international arrangement includes Germany, France, and Switzerland and would give to members complete domination of all markets other than United States. Present pact, formed in 1927 by German Dye Trust and Kuhlmann, was joined by Switzerland in 1929. No formal statement was forthcoming from either Sir Harry McGowan or Lord Melchett.

England's threatened abandonment of the theory of free trade for one of protection materialized November 25. Such action affects our industrial chemical industry but slightly. Chemical prices remained fairly stable with demand from most consuming lines satisfactory.

### France Acts on Nitrate

Chile and natural nitrates appeared quite frequently linked in month's headlines. Aside from political unrest and present government's attack on "Cosach" terms (p. 577, this issue) "Smiling" President Juan Montero finds two problems, chemical in nature, at his new doorstep. Soviet, short on good supply of nitrogenous material and long on oil, proposes exchange of soda and copper for petroleum. France is raising nitrate tariff in reprisal against Chile's action in increasing rates on French luxury articles. Some 400,000 tons of nitrate are said to be at stake and natural nitrate producers are beseeching Chilean Government officials for aid. French nitrate importers co-operate in efforts to eliminate proposed bounty of \$8 a ton, in hearing, Nov. 24, before Tardieu, former French premier and now Minister of Agriculture. Part of money collected from tariff would be granted by French Government to French nitrate industry to foster its development; balance would be used to grant reduction in cost of nitrates to farmer.

Nitrate producers have expressed willingness to discuss reduction of price in France, but object to distribution of money collected from imports to French competitors. Chilean interests account for about two-thirds of the annual nitrate imports of nearly 450,000 tons to France.

Societa Italiana per IL Gas, (Italgas) Rome, plans sale of subsidiary, Aziende Chimiche Nazionali Associate (Aena) chemical company operating at a loss. Parent company is debtor under Italian agreement securing series D 7% bonds of International Power Securities Corp. and subsequent to sale of Aena would cancel \$530,000 of series D bonds. Bankers Trust of New York is trustee for bonds and requests majority of bondholders consent to sale.

German companies are reported co-operating with Russian "Potash Trust" in opening up mines in the Ural. Negotiations between Soviet and German concerns deal with a contract for construction of second chemical factory at Beresniki, 20 miles south of Solikamsk. Russian "Potash Trust" assures Germans that it has no intention of competing in foreign markets.

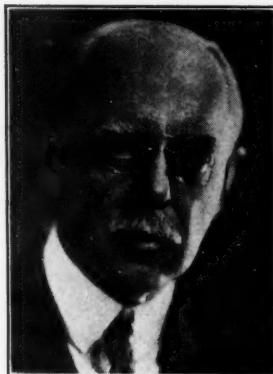
## We Congratulate---and Thank:

Arthur D. Little, December 15, 1863

Milton C. Whitaker, December 16, 1870

Benjamin T. Brooks, December 29, 1885

By a pleasant coincidence three of our Consulting Editors celebrate their birthdays during December and this month's meeting of that Board will be the third anniversary of our monthly luncheons together. It seems wholly appropriate to single out these distinguished chemists for our congratulations, and we should be ungrateful indeed if we did not try to express our thanks to them and to their colleagues. Readers of *CHEMICAL MARKETS* we are sure, do not appreciate how much we all owe to their suggestions and criticisms. It is a real debt.



Dr. Arthur D. Little

Dr. Little we hail, "His Excellency the Chemical Ambassador," our Minister Plenipotentiary to the Public. No man has so often, so gracefully, or so effectively interpreted the aims and the problems of chemical industry—a unique service to chemistry, less substantial than his technical discoveries and his commercial developments; but not less important. He has won many honors and we believe is the only man to be elected President of the American Chemical Society, the British Society of Chemical Industry, and American Institute of Chemical Engineers.

Dr. Brooks spent five years in Government Service in the Philippines, five years as research fellow at Mellon, five years as chemist of Mathieson Alkali—a broad and varied background for his most recent five years as consultant, specializing in the petroleum field where many of us see a chemical development which some day may rival the coal-tar industries. His other specialties are accuracy in thought, word, and deed, and one of the most interesting amateur collections of mineral specimens gathered by himself in the field.



Dr. Benjamin T. Brooks

Dr. Whitaker has two pet aversions, the Volstead Act and the

Washington Complex, both of which he attacks with a vigor of speech and logic of thought that are refreshing amid the sloppy sentimentalities and mental dishonesties of the day. Like Dr. Reese, he is one of that little band of real chemical executives—a college professor of chemistry who became the president of one of our greatest chemical manufacturing enterprises. A rare combination of thorough technical training and business common sense, animated by dynamic energy, his contributions to chemical industry are numerous and varied.



Dr. Milton C. Whitaker

# Usual—and Unusual Uses of Lampblack

By Luther Martin IV\*

**F**AR from being outmoded after centuries of use, lampblack today is more versatile than ever. Its special properties recommend it for dozens of purposes in as many industrial processes, and research has not yet exhausted all possibilities for its utilization.

By far the greatest tonnage of carbonblack goes into the paint industry, where it is used almost exclusively for tinting purposes. No other pigment will produce the beautiful blue gray that results from mixing lampblack with white pigment. Durability, however, is acquired along with beauty, for lampblack is one of the most permanent of pigments. Every ship in the American Navy is protected from the ravages of salt, air, and water by paint in which lampblack is an ingredient.

Paint grinders' specifications, while varying, call generally for a lampblack with an opaque top color when ground in oil, and a clear blue tone when reduced with white pigment; the capacity to grind easily and dry quickly; and a low percentage of ash and benzol extract. The carbon content is always an indication of quality, the purest black having the highest percentage of free carbon. Many different grades, or, from the standpoint of color, shades of lampblack are used in the paint industry. This apparent variability is because few consumers, although they may buy for the same ultimate use, agree on the shade best suited to their purpose. And although manufacturers of lampblack offer an average of ten different grades of black, some companies making as many as twenty, few grades marketed are

\*Secretary, Wilkes, Martin, Wilkes, Swann Corp., subsidiary.



Mr. Martin is the first chemical executive to own and operate a plane. He finds it a distinct aid in keeping in close touch with customers

matched in every respect by competition. Even a slight difference in the method of manufacture will affect the final product. A particular use of lampblack is the coating of telephone instruments. An enamel, composed largely of lampblack, is baked on the metal cast of the instrument to produce the hard, wear-resistant surface that constant use necessitates.

Lampblack's monopoly as an ingredient in paint for automobile fenders is due to its lack of brittleness. For the same reason, quantities of this pigment are being used in the manufacture of solid rubber truck tires, and certain other rubber products. Tests have proved that when lampblack is used in rubber, the loss of tensile strength upon ageing is far less than when some other pigment is used. Lampblack also accelerates the cure or vulcanization of the rubber, and because of its softer texture, generates less heat than carbon black.

The automobile is an object lesson in the uses of lampblack, for the very fact that the automobile goes, is, in a way, dependent upon lampblack. The little carbon brushes in the generator are made of lampblack and a filler, distributing the high tension current

from the generator through the battery to the spark plugs which ignite the gas. These brushes are subject to great tension and wear, and while they must be good conductors, they must also have the greatest possible durability.

The storage battery which supplies current for the starter and the lighting system also contains lampblack, which gives porosity to the negative plates.

Before being accepted by the storage battery manufacturers, the lampblack is subjected to most rigid tests under sub-zero and very high temperatures with which no actual temperatures on this earth would compare. Automobile tops and curtains, depend on lampblack for their glossy finish and color and bring us to the oilcloth, artificial leather, and the coated fabrics industries. Here lampblack serves a double purpose,—it colors the product and increases its durability. With other ingredients it makes the finishing coat for leather cloth and is also used exclusively in the filler or binder directly to the cotton fabric which forms the base of imitation leather. Camera boxes, trunks, suitcases, women's purses, hats and patent leather shoes are only a few of the artificial leather products in which the smooth glossy finish and color, the strength and wearing qualities are due in no small measure to lampblack. It is also an important ingredient in the special leather cloth made to resemble grain leather in a variety of colors for upholstering purposes. As a coloring agent, it is used by the coated fabric concerns to imprint designs on wall paper.

#### **Additional Lampblack Uses**

An entirely different field of usefulness is in concrete and cement work. True, the advantage of lampblack in a mixture of this material has been chiefly that of coloring. Large amounts of the pigment have been used on the Pacific coast where miles and miles of concrete highways and sidewalks would glare insufferably under the California sun were it not for the addition of lampblack to the mixture. As it is, the dazzle of uncolored cement is adequately dulled by the characteristic blue gray tint of lampblack and pedestrians and motorists alike are saved eye-strain. In addition to coloring, however, a certain amount of lampblack accelerates the curing time of a concrete road. The lampblack is mixed in a paint form and is sprayed on the concrete and allowed to stand. This method eliminates the necessity of covering the wet concrete with earth, periodical watering, and removing the earth. After the curing process has been completed, the paint simply wears off. Lampblack in this same mixture has also been used most successfully as a protective paint coat on pipe lines,—particularly those which carry natural gas.

The further versatility of lampblack is demonstrated by its use in a number of odd and unexpected ways. In the therapeutic sun lamps, under which so many Palm Beach tans have been acquired the "carbon sticks" which, radiate life-giving ultra-violet rays, are shaped very much like pencils, the outer cases of which are composed largely of lampblack. The brightness of silver on display in a jewelry store seems a far cry from lampblack, yet the pigment is, according to an authority, one of the best silver polishes obtainable. When silverware emerges

from the washing and plating, it is very whitish, not at all the color of silverware when it is offered for sale. To produce the lustre which is half the beauty and more than half the sales appeal, every piece of silver is polished with a mixture of lampblack and kerosene. The chalky white color disappears and the knives, forks and spoons take on a permanent sheen. Those experienced in this work say no other substance has the efficiency of lampblack as a silver polish.

The pigment also figures indispensably in the world of crime, and although the part it plays is small, it is, fortunately, on the side of the law. The ink that is used in finger printing is based on lampblack. It is also a common practice in many hospitals to take foot prints of babies in order to prevent mistakes in identity. The present widespread use of finger printing originated quite unintentionally with Sir William Herschel, who, in 1858, on an official journey to India, had the natives add thumb prints to their written signatures or marks to make the signing of a contract seem more impressive and more binding.

Lampblack has been used in inks since time immemorial, but it has a special value in the printing of bank notes, stocks and bonds. The making of these special lithographic inks, where soft colors are desired, requires the incorporation of lampblack. To the multiplicity of uses to which lampblack is put, one could add its adaptability for such widely divergent purposes as insulating and stenciling, for the manufacture of fireworks and resistance carbons. But its versatility has been proved and its usefulness in all these fields gives lampblack an outstanding and highly specialized position in industry today.

Perhaps the most unusual service ever demanded of lampblack was as a movie property. In one scene of Howard Hughes' air spectacle, "Hell's Angels," a giant Gotha bomber, out of control, plunges to earth, leaving a trail of fire and dense smoke behind it. The billows of so-called smoke were nothing but lampblack, released as the ship spun to the ground, but it gave an effect that was almost too realistic.

### ***New Construction***

Vitrified Products, manufacturers of clay products, awards Austin Co. contract for the design and construction of a complete new plant, St. Thomas, Ontario. The project represents investment of \$60,000 and includes three structures with total floor space of approximately 25,000 feet. Contract will be completed in 35 working days and will require 50 tons of structural steel. The Toronto office of Austin will be in charge of the work.

Canadian Industries, Ltd., Montreal, lets contract for new cellophane plant to be located at Shawinigan Falls, Que. With equipment, the plant will cost approximately \$1,000,000.

Champion Fibre Co., Asheville, N. C., plans \$1,000,000 expansion program at its plant at Canton, N. C. Three large new buildings are to be built and \$500,000 worth of machinery to be installed. The contract for the machinery is let to Pusey-Jones Corp.

Stauffer Chemical Co. plan construction of a new building in Los Angeles, 100 x 160 feet, for production of superphosphates.



An exact reproduction of probably the largest platinum nugget ever found on this hemisphere. It came from the western coast of South America in 1897 and weighed nearly two pounds

## Platinum— *forms a Cartel*

**A**FTER lengthy discussions, the anticipated agreement between the chief platinum producers has been reached and a new English company formed, Consolidated Platinums, Ltd. This company has negotiated contracts to control the reselling of almost all of the new platinum production of Russia, Canada, South Africa, and Columbia. The company will, it is understood, receive the entire output of the members and will have sole charge of its marketing.

Such action will exert a profound influence on market conditions in this country and large consumers must adjust to meet the new situation.

The new project will be managed by a committee thoroughly representative internationally. According to the "Chemical Trade Journal" (London) reporting a news item appearing in the London "Times" the only director appointed at present is D. O. Evans, of the Mond Nickel Company. Representatives from the Edel-metalle-Vertriebs Aktiengesellschaft, Johannesburg Consolidated Investment Company, New Consolidated Gold Fields, and Comania Minera Choco Pacifico will be chosen.

### Search for New Uses

Control is but one function of the Consolidated Platinums Company. Another task will be to find new uses and to extend those already known, to increase, the present rather limited consumption. This herculean task, similar to the one which the Mercuric Europa (mercury cartel) has committed itself, appears quite certain. The very price of either of these metals is the strongest incentive to substituting cheaper metals in commercial process.

Chemical industry is one of the smallest outlets for platinum as may be seen from the accompanying chart prepared by Tyler and Santmyers, Bureau of Mines. Yet, in practically every instance where it is employed, it is indispensable and, therefore, despite the small quantities consumed, platinum is one of the most important materials of the chemist. Consump-

tion in various fields is very well illustrated by the figures for 1928.

Chemical.....	18,529 oz.
Electrical.....	21,316
Dental.....	10,930
Jewelry.....	93,468
Miscellaneous.....	5,431
Total.....	149,674

Previous to the World War, Russia had a virtual monopoly of platinum. At times she produced as high as 300,000 troy ounces a year, or roughly ninety-five per cent. of the world output. Colombia accounted for about three to four per cent. After the War, Russian production fell to 20,000 ounces, while that of Colombia rose to 40,000. Still quite a void was created in the years 1922 to 1924 and the search for additional sources of supply was stimulated by the high price prevailing immediately following the cessation of hostilities when the prices on practically all commodities were greatly deflated. In 1924, discovery of commercial deposits in South Africa was announced and by 1928 they had displaced Canada as the third largest supplier. Recent developments in the Sudbury nickel-copper industry of Canada (described in detail by S. J. Cook, Canadian Research Council, in Chemical Markets, in November) point to much larger production from this point, while reports from Russia indicate that the Soviet is very much interested in increasing substantially their output and regaining at least partially its former position.

### Average Annual Output of Platinum, Troy Ounces

	Pre-war <sup>1</sup> 1909-1914	Post-war <sup>2</sup> 1926-1928
Russia.....	200,000	90,531
Colombia.....	12,080	47,266
Australia and Tasmania.....	790	326 <sup>3</sup>
United States.....	594	4,668
Borneo and Sumatra.....	180	.....
Burma.....	46	.....
Canada.....	33	10,390
South Africa.....	.....	11,070
Total.....	213,723	164,251

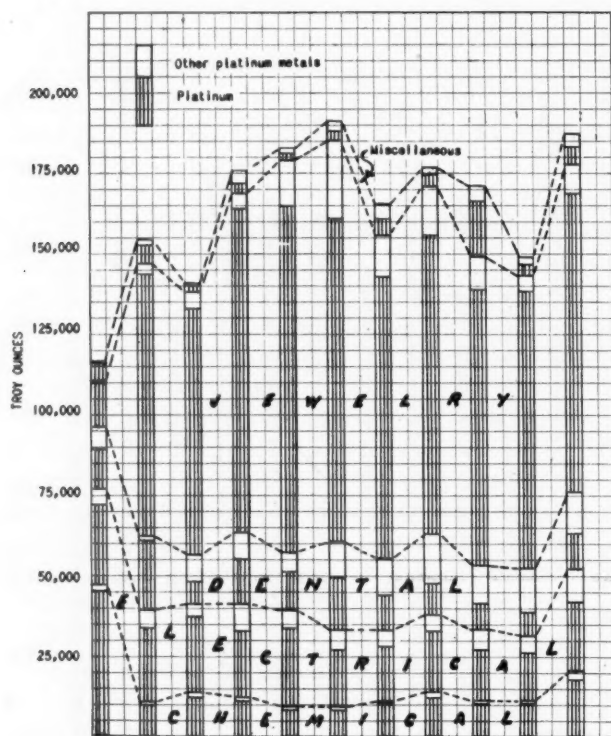
<sup>1</sup>Wagner, P. A., The Platinum Deposits and Mines of South Africa, Edinburgh, 1929, p. 2.

<sup>2</sup>Calculated from figures compiled by L. M. Jones of the Bureau of Mines.

<sup>3</sup>New South Wales only.

Everyone even slightly familiar with laboratory practices is acquainted with the important role played by platinum in research and control work as chemical

ware in the form of crucibles, dishes, evaporating pans, filter cones, electrodes, gauze, and miscellaneous instruments. In some instances other metals have been



Chemical industry consumes but a small part of the World's platinum production\*

substituted with success, but generally speaking, none are available which have the all-round general utility of platinum. Its place in the laboratory and in the chemical plant seems definitely secure for a long time.

In the last ten or fifteen years chemical industry has found uses for platinum aside from laboratory ware but based upon the same characteristic that makes it so valuable for research work. Platinum in some form is used as a catalyzer in certain processes employed for the manufacture of sulfuric, acetic, and nitric acids. From 500,000 to 600,000 ounces of platinum, it is estimated, are now in use as contact masses in the manufacture of sulfuric acid by the contact method. Some doubt exists as to how much greater this volume will grow because of the competition from vanadium pentoxide catalysts. The matter is one open to serious controversy pro and con and a discussion of the question here at any length would be futile. The ever growing synthetic production of nitric acid requires large amounts of platinum for the gauze catalyst. A very recent improvement in this field is that of an alloy of platinum with ten per cent rhodium. A process for making acetic acid is based upon the rapid oxidation of alcohol by the aid of spongy platinum. It is only possible to outline in a very sketchy way the uses of platinum in this direction, due to the degree of secrecy surrounding all development work of this type. Only the barest

\*This chart and those appearing in subsequent pages are taken from recent Bureau of Mines circular on Platinum by Tyler and Santmyers.

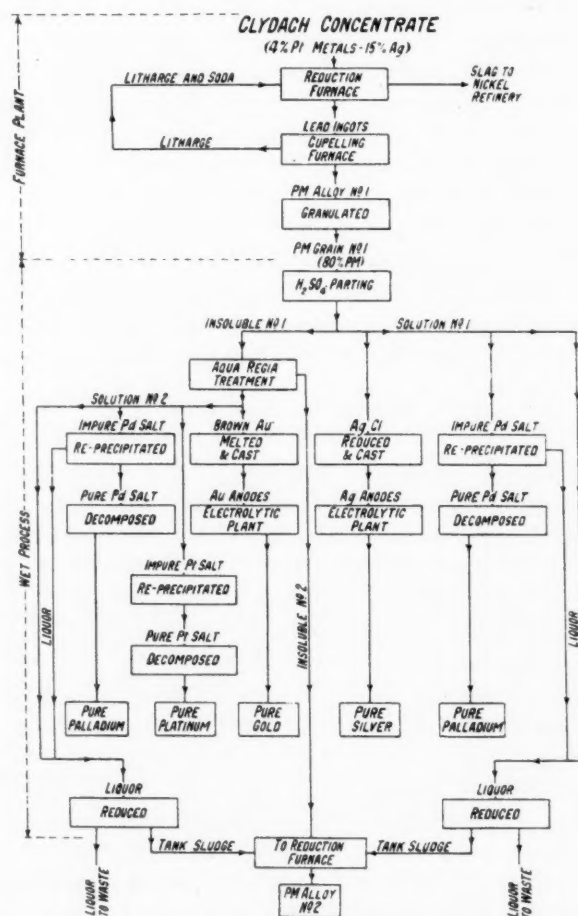
amount of information is disclosed although patent protection is usually sought after and granted.

An important use of platinum in the process industries is in connection with parts for electrical precision instruments. One of the most widely used thermocouples is the Le Chatelier platinum rhodium couple, where one of the wires is the purest platinum obtainable and the other an alloy of 90 parts platinum and ten parts rhodium. Another very important application in pyrometry is in the resistance thermometer where the temperature is measured by the change of electrical resistance.

### Refining Developments in England

The fusion of the International Nickel Company and the Mond Nickel Company and the recent discoveries and developments at Sudbury, Canada have brought about important and interesting expansions in the refinery capacity in England. With the enlargement of the Acton Precious Metals Refinery of the Mond Nickel Company, completed early this year, it is reported reliably that some 300,000 ounces can be produced in England, annually.

The refinery in existence since 1924 has worked on rich concentrates from the carbonyl process used at the Clydach nickel works and later crude platinum from South Africa and the latest improvements have been designed to deal with the type of concentrates



Flowsheet of the "Acton" Process for refining platinum concentrates

brought over to England from the electrolytic nickel refinery in Ontario, Canada.

The process known as the "Wet" method consists chiefly of the following steps although some modifications are introduced depending upon the type of crude concentrate being worked. The concentrate is given a preliminary smelting and the precious metals (platinum and associated metals) collected with the lead. The excess of lead is removed and reused. The alloy, four times as rich as the original concentrate, is then treated with sulfuric acid to part the lead. In alloys particularly rich in lead nitric acid may be required but economy dictates the use of the former wherever possible.

The crude platinum is then treated with aqua regia. The platinum is precipitated as ammonium platinichloride, is heated to redness forming pure platinum sponge. This is then fused in a furnace made from blocks of lime by means of an oxyhydrogen blowpipe, or in an electric furnace. Further intensive treatment of the solution yields the remaining metals of the platinum group. A flowsheet of the process taken from an article describing in detail the Acton Works in the May, 1931 issue of "The Industrial Chemist" (London) is shown on page 574.

As might be expected the plant contains a great many novel improvements designed specially to reduce to a minimum the loss of metal, a most important consideration when dealing with metals as costly as those refined in this process.

Platinum deposits in the United States are of little importance and would not prove practical of exploita-

tion were it not for the gold content. About one-third of world's supply of refined platinum is produced in the United States from crude shipped mainly from Colombia.

New Platinum Metals Recovered by Refiners in the U. S.<sup>1</sup>

Year	Platinum Troy Ounces	Palladium	Iridium	Osmiridium	Others	Total
1914.....	3,430	2,635	64	195	...	6,324
1915.....	6,495	1,541	274	355	...	8,665
1916.....	24,518	2,885	370	315	...	28,088
1917.....	33,009	4,779	210	833	...	38,831
1918.....	54,399	4,024	465	539	...	59,753
1919.....	40,220	3,807	401	402	...	45,109
1920.....	36,015	4,309	418	409	...	41,544
1921.....	51,791	2,686	286	581	1,026	56,370
1922.....	54,142	1,943	210	1,301	122	57,718
1923.....	46,780	1,934	280	787	16	49,797
1924.....	57,827	6,065	680	1,261	174	66,007
1925.....	41,300	7,358	283	648	54	49,643
1926.....	76,154	6,437	234	2,113	43	84,981
1927.....	41,121	3,879	256	631	163	46,050
1928.....	51,427	5,148	1,658	458	348	59,039
1929.....	41,760	5,295	302	364	256	47,977

<sup>1</sup>Mineral Resources of the United States (Annual), Part I.

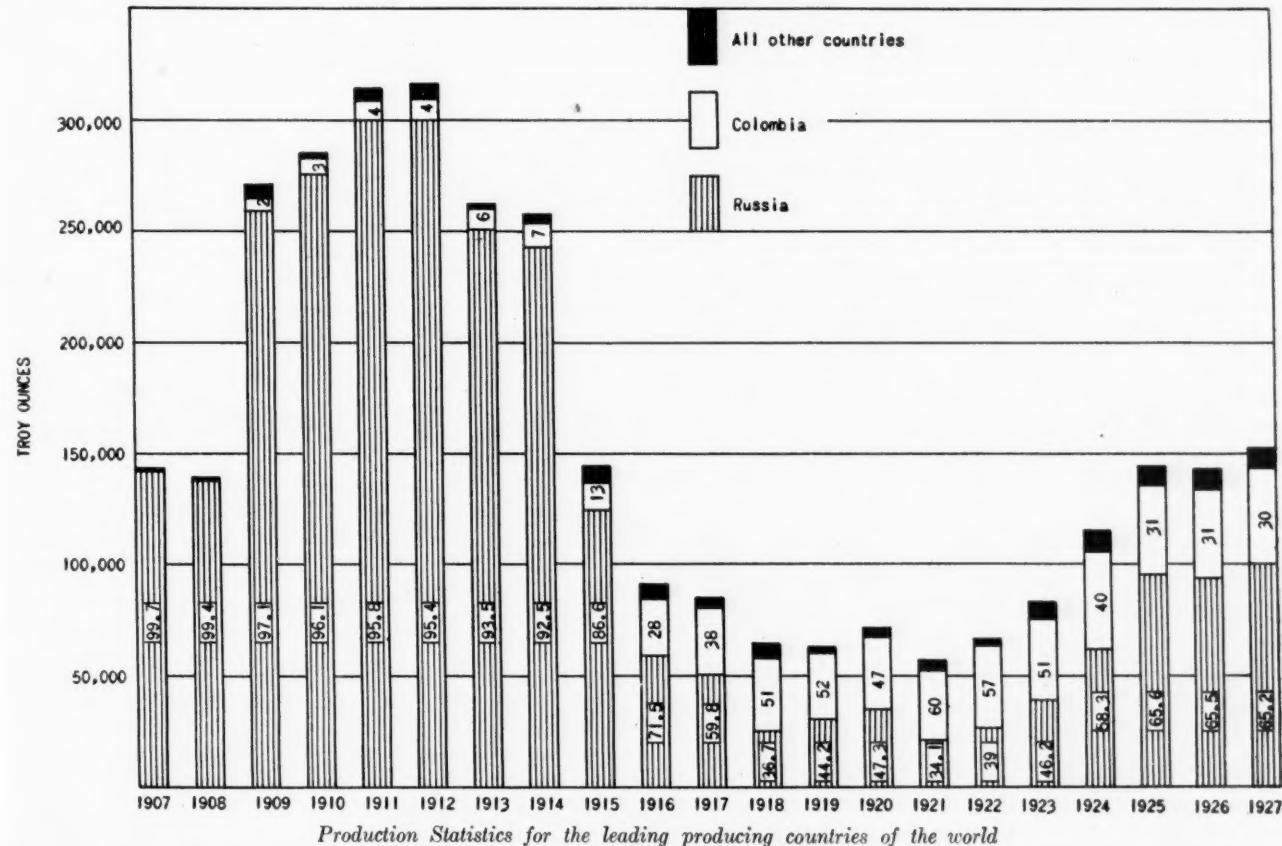
The balance of the volume required in this Country of course is made up in imports. The figures for importations from 1914 to 1929 in troy ounces are as follows:

Table 15—Platinum Metals Imported for Consumption into the United States, 1901-1929. Troy Ounces<sup>1</sup>

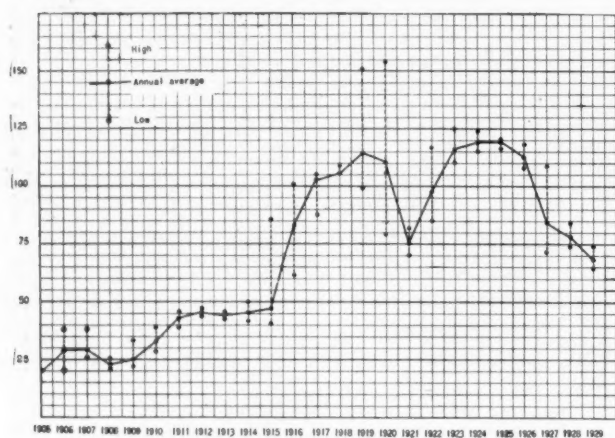
Year	Quantity <sup>1</sup>	Value
1915.....	68,778	\$42,768,688
1916.....	63,795	3,710,815
1917.....	35,724	2,954,220
1918.....	56,756	5,167,908
1919.....	68,054	6,747,447
1920.....	100,546	10,617,440
1921.....	78,378	5,418,464
1922.....	109,998	8,981,631
1923.....	106,637	10,466,705
1924.....	111,359	11,030,349
1925.....	125,802	13,230,148
1926.....	134,797	13,451,835
1927.....	148,769	12,413,494
1928.....	135,233	9,357,737
1929.....	155,075	9,119,479

<sup>1</sup>Mineral Resources of the United States, Bureau of Mines (Annual), Part I.

<sup>2</sup>Does not include manufactured products, vases, retorts, etc.



The history of the platinum industry is closely allied with continued efforts at world wide agreements between the principal factors in the field. Previous to 1903 international control was largely in the hands of Johnson, Matthey & Company, a British firm. In that year a French firm entered the field with a refinery near Paris and an international syndicate was formed consisting of the British Company, Heraeus, the principal German refiner, Baker & Company, largest American producer, and the French producer. For many years this syndicate exerted a very stabilizing influence on the market. With the declaration of war in 1914 the international selling organization disbanded but was again renewed after the signing of the Armistice. In March of 1927 the syndicate again dissolved because of its inability to work out a satisfactory allotment for the Russians who in turn organized a selling organization known as the Edelmetalle-Vertriebs Aktiengesellschaft for the producing unit, Rusplatina. Advices from abroad indicate that the Edelmetalle-Vertriebs Aktiengesellschaft is participating in the formation of the new international agreement.



Platinum price trend for a 25 year period

Refined platinum is on the free list if in unmanufactured form. In the Act of 1930, "Articles or wares not specially provided for, if composed wholly or in chief value of platinum,—and articles or wares plated with platinum,—whether partly or wholly manufactured" takes a rate of 65 per cent ad valorem, an increase of five per cent over the 1922 rate.

Prices fluctuate daily in the platinum market and quotations follow the trend of the London market. With England off the gold standard some confusion is unavoidable. As can be seen from the accompanying chart of prices the market reacts rather violently to disturbances of any kind. With the advent of the War and the dissolution of the international agreement prices rose to record figures and in 1920 some deflation occurred to accompany the general period of reorganization. With the renewal of the pact between the producers, the price was again higher. With the disruption of the agreement in 1927, due to the inability to appease the Soviet State Monopoly, the

price declined precipitately and in sympathy with restriction of demand from most of the consuming industries in the last twenty months the price has declined still further. To offset the possible stabilization of prices possible because of the new agreement is the unsettled condition of the exchange and possible changes in requirements from various sources.

## Ammonia and Purification

Editor, CHEMICAL MARKETS:

The writer's paper, "New Applications of Ammonia", which appeared in your August, 1931 issue was originally presented, as per your footnote, at the annual meeting of the Compressed Gas Manufacturers' Association early in 1931. Two of the applications have developed so rapidly since that time that the statements in the paper are out of date. I trust that you can give the proper prominence to these two corrections:

(1) Regarding the use of ammonia in the Ammonia-Chlorine treatment for water sterilization, taste-removal, algae and slime-prevention—It was stated in the article that "less than a year ago there were five groups employing this treatment; today over one hundred are in existence and the number is rapidly increasing." The process has been meeting with such favor that today there are over two hundred and fifty users.

(2) The short paragraph upon hydrogenation of edible oils in the original paper indicated considerable doubt as to the application of dissociated or cracked ammonia in this field. Subsequent research and development work has indicated that the use of cracked ammonia as a source of hydrogen in treatment of edible oils, or in fact in the entire field of hydrogenation reactions, is much more attractive than at first supposed. It was originally thought that the presence of nitrogen might be a major disadvantage, whereas actual factory scale experiments have shown this not to be the case.

The outstanding advantages offered by the application of cracked ammonia hydrogen to all classes of catalytic hydrogenations are (1) the extreme purity of the hydrogen, thereby eliminating all catalyst poisoning difficulties normally encountered in steam-iron hydrogen, (2) the low capital investment in the hydrogen plant (cracked ammonia installation being one-third to one-fourth the cost of either steam-iron or electrolytic plants), (3) practically automatic operations of the ammonia crackers, thereby giving flexibility of production volumes and requiring almost no labor to operate, (4) ammonia cracker units occupy relatively very small factory space and no storage area required for coke, iron oxide boxes, etc.

The presence of nitrogen in the gas necessitates the handling of larger gas volumes per unit of product hydrogenated and further tests are now under way to ascertain definitely the influence of the volume increase in the adaptation of cracked ammonia to hydrogenation processes. The rate of hydrogen absorption by the reaction is in general proportional to the partial pressure of the hydrogen so that the diluting effect of the nitrogen could readily be overcome by increase in total pressure. Other minor changes in equipment design, catalyst concentration, etc., to handle the diluent nitrogen properly can easily be made.

Wilmington, Del., Nov. 25, 1931.

M. H. Merriss.

## New Aluminum Cartel

Alliance Aluminum Campagne A. G. replaced the old aluminum cartel during November. Capital of 35,000,000 Swiss francs, and powers to increase to 65,000,000 nominal, marks new stage in international organization of the industry. The board includes representatives of British, Canadian, German, French and Swiss producers.



# Seasons Greetings

TO USERS AND  
NON-USERS OF

## PENT-ACETATE AND PENTASOL

The SHARPLES SOLVENTS Corp.

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501F FIFTH AVENUE, NEW YORK

# CHEMICAL

## *Photographic Record*

*First woman to receive the Loomis Chemistry Prize at Yale: Miss Katherine Haring of New Haven, a Graduate of the Class of '29 at Mount Holyoke College, who has been awarded the Fellowship of \$1,500 by the University*

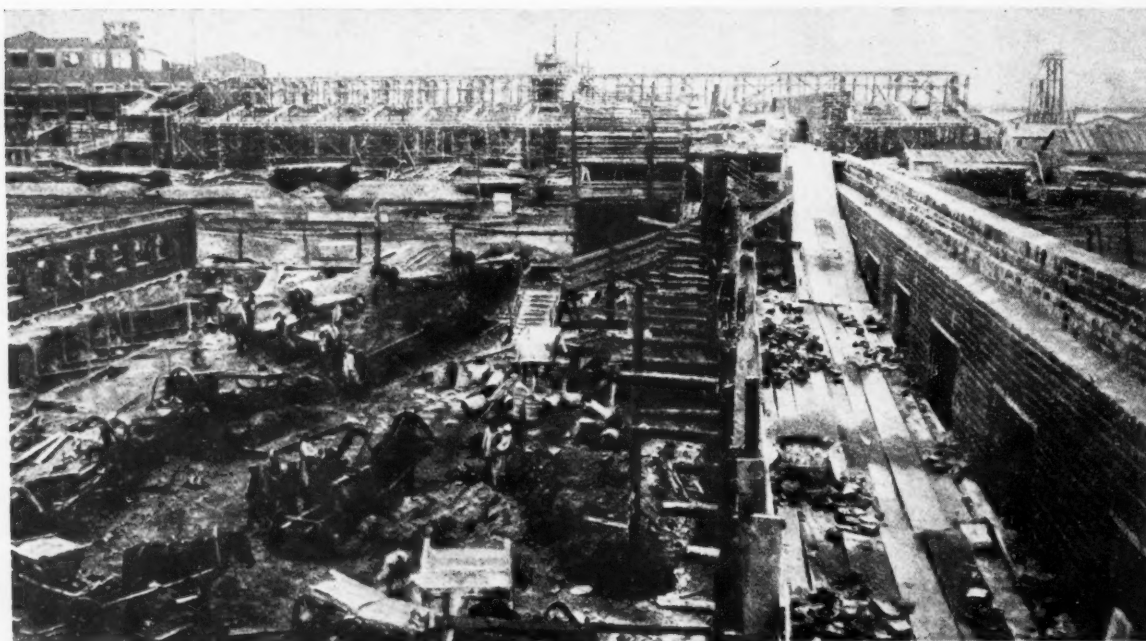


Wide World

*As a result of the development of the chemical industry which has taken place in the last few years, the Soviet Union is now not only manufacturing many types of chemicals which pre-war Russia had to import, but is also exporting increasing quantities of chemical products. Export figures during the past two years, though not considerable, are evidence of the growth of this branch of Soviet industry. Last year total chemical exports from the Soviet Union equalled 61,616 metric tons, valued at 7,059,000 rubles (\$3,530,000), an increase of 124 per cent in volume over the 1929 export figures (27,044 tons). The apatite (phosphate) mines in Khibinogorsk produced in first half 1931, 300,595 metric tons of which 232,466 tons were of high-grade apatite with a phosphoric acid content of 32% and over. While the production of high grade apatite reached only 81.9% of planned figures, quantity will, nevertheless, it is said, be sufficient to supply all the phosphate plants in the Soviet Union*



*Lifting Pyrite to the Crusher at a Baku Sulfuric Acid Works*



*Superphosphate Plant at Voskresensk in the Moscow Region*

# AL NEWS REEL

## Record of Chemical Activities

Who made the discovery of Element 87? Right—Prof. Jacob Papish, Prof. of Chemical Spectroscopy at Cornell University, Ithaca, N. Y., who announced his discovery of the new chemical element No. 87 on October 12, and—Below—Prof. Fred Allison, Head of Physics Dept., Alabama Polytechnic Institute who claims similar discovery of both elements 85 and 87. Controversy has waxed fiercely in the daily press. Papish contends machine used by Allison can be deceived by chemical mixtures into registering elements which are not really present. In any event cost of production of either element is prohibitive



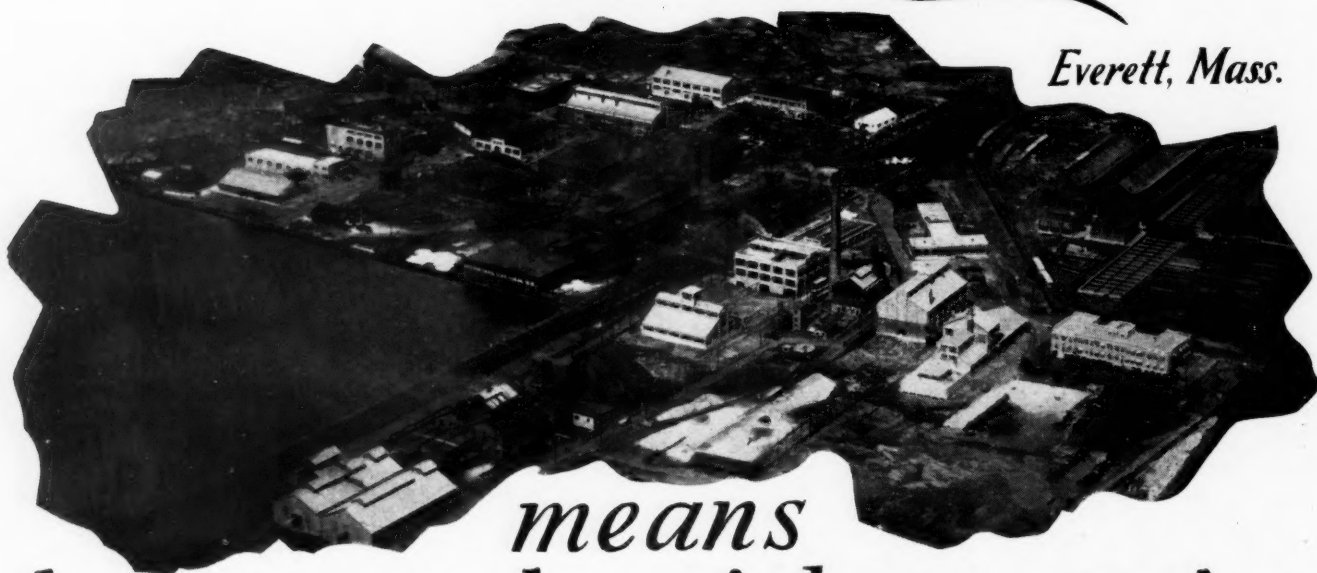
Keystone



Merrimac, Eastern Monsanto subsidiary, completes sixteen months rebuilding and consolidation program at Everett, one month ahead of schedule. The plant at Woburn is being dismantled after 78 years of continuous activity and all manufacturing centered at Everett. When on March 14, 1930, fire destroyed the power house, alum plant, two chamber units, the machine shop and locker building, it was decided to take immediate steps to combine all operations at Everett where ample space was available. Bird's-eye view of consolidated and enlarged plant



# CONCENTRATION OF MANUFACTURING AND SHIPPING here



*Everett, Mass.*

*means*  
better and quicker service  
*for YOU*

Our plant at Everett, Mass., has been rebuilt and remodeled. Manufacturing formerly done at Woburn, Mass., has been transferred to Everett. One large, efficient, closely-knit organization

now produces Merrimac Industrial Chemicals. Manufacturing, handling, and shipping are perfectly synchronized to give our customers more than they expect in the way of service.

**MERRIMAC CHEMICAL COMPANY, INC.**

Everett Station, Boston, Mass.

*A Division of*

**Monsanto Chemical Works**



## "Cosach" - Threat or Promise?

Chile's spectacular combine, designed to present a united front to the inroads of synthetic nitrogen, is attacked from within by various factions seeking changes for political, financial, and legal reasons.

**P**OLITICAL, financial, and legal aspects of the Chilean nitrate situation have become very complicated in the past few months and have exerted a profound influence on the purely business relationship of the industry in its contacts with customers and competitors. The \$375,000,000 nitrate combine, commonly known as the "Cosach" has been attacked successively from each of these three angles. To say the least such actions have weakened considerably the position of the natural nitrate. Benefits confidently expected from the consolidation of practically all of the natural nitrate producers into one centralized corporation and abandonment of the Shanks Process for the more efficient Guggenheim Process have been, in a large measure, offset temporarily by the confusion attending the overthrow of the Ibanez regime; by the attack on the terms of the Compania Salitrera Nacional by the Lautaro preference shareholders; by the financial jumble of bonds and export taxes and dividends involving finance and politics.

Immediately after the change in civil governments in Chile July, a committee was appointed by the new president to investigate the negotiations leading up to the formation of the "Cosach" and the Chilean Government's participation in the company. This commission of technical advisors has just reported its findings and in it bitterly denounces the entire structure reared by former President Ibanez. The accusations may be summarized briefly into five points of issue:

1. The Chilean Government should not have permitted control of the chief national industry of the country to pass to foreigners or to have countenanced any arrangement that made the Chilean Government a partner of foreigners in the enterprise.
2. Changes in the laws governing the formation of the "Cosach" made by former President



*President Juan Esteban Montero is unlikely to upset the present terms of the "Cosach"*

Ibanez were unconstitutional.

3. Evaluation of the companies financing the project was dishonestly determined.
4. The so-called Guggenheim process cost \$30,000,000 in losses.
5. The new sales system lost a large part of the former tonnages in European markets.

It must be remembered that the findings of this committee were prepared in the midst of a violent political upheaval and that the committee would hardly be unbiased. Further, the political complexion of the Commission would prevent the controversial matters from receiving anything but pre-

influenced study. Already it appears quite likely that the storm of disapproval may be but a flash. President-elect Juan Esteban Montero is looked upon as stable and free from any desire to embark on any hasty and ill-advised course. Further, the Minister of Finance is reported as having designated a new commission to continue the study of the various angles of the question with power to make suggestions looking to correcting the structure of the "Cosach" if expedient or advisable. That some inequalities may be dealt with appears quite probable but with the return of normal conditions it is very unlikely that any drastic measures will be carried through.

The terms of the formation of the "Cosach" have been subjected to a rapid fire of criticism from still another quarter. A group of British and French preference shareholders have attacked the terms as unfair and for several months have been agitating in the press for a new deal. Answering these complaints the President of Lautaro, E. A. Cappelen Smith is quoted as follows:

"Lautaro shareholders should realize that under the present plan Lautaro no longer pays an export tax of 100 pesos (£2 10s.) per ton on every ton of nitrate shipped, as was the case before Compania de Salitre de Chile was organized, but instead, together with the rest of the combined industry, is subject to a bond service charge of only 60 pesos (£1 10s.) per ton, which

reduced charge is required to be paid not on every ton of nitrate shipped, but only to the extent necessary to meet such service charge. The consolidated enterprise, of which Lautaro is an integral part, is now operating under the plan, and no change could be made in the conditions of the amalgamation without a complete dissolution of *Compania de Salitre de Chile* and the setting up of a new structure."

This statement called forth a more lengthy one in rebuttal by the group of shareholders and which was forwarded to the Chilean Minister of Finance. In it the points of dispute are elaborated upon as follows:

"The statement published by E. A. Cappelen Smith fails to reply to the charges or complaints made at the protest meeting of Lautaro preference shareholders held in London on Sept. 11 last. These complaints which were endorsed by 103 shareholders representing about 550,000 preference shares, were precise and specific. It was said that, by the exercise of their all round control, Messrs. Guggenheim Brothers had:

- (1) Shifted the burden of a debt of over £5,500,000 from their subsidiary Anglo-Chilean to Cosach.
- (2) Obtained payment of the said debt in Cosach bonds.
- (3) Obtained a charge on Cosach assets by way of security.
- (4) Obtained the further security of public taxation for the said bonds.
- (5) Obtained a premium of 10%.

Complaint was also made of the methods resorted to in the furtherance of the Cosach plan, for instance, of the publication of Cosach balance sheets which were widely discrepant according as they were intended for New York or for Chilean consumption.

E. A. Cappelen Smith's statement studiously evades all these points. In vague terms he suggests it is better for shareholders to co-operate with the persons in charge of the new organization rather than recriminate. This is the height of irony. Messrs.

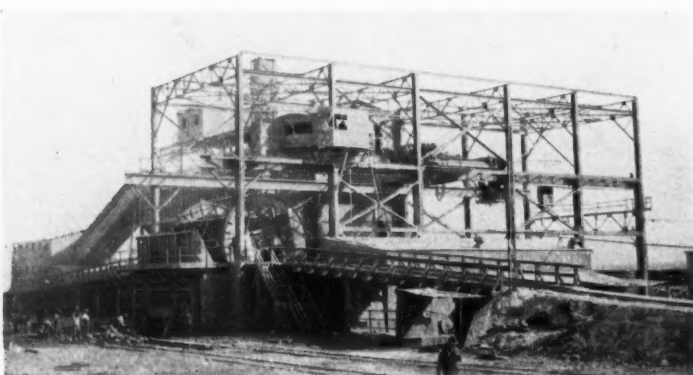
Guggenheim Brothers exercise control all round. The transaction complained of is one in which Messrs. Guggenheim, acting in one capacity, bargained (?) and settled terms with themselves in another capacity over the heads of Lautaro preference shareholders who were never consulted although seriously injured by the transaction. What do Messrs. Guggenheim Brothers mean by co-operation?

Apart from this meaningless suggestion, E. A. Cappelen Smith makes but one definite statement and in that he distorts the position. He asserts that Lautaro is now only paying a £1.10 per ton export tax instead of £2.10 as was the case before Cosach was formed, that no change can be made short of complete dissolution, and lastly he hints that the present agitation is harmful and destructive of shareholders' rights. The public might, therefore, imagine that if the transaction complained of had not taken place, Lautaro would be paying a £2.10 instead of a £1.10 tax; in other words that this transaction means a £1 tax reduction and accordingly shareholders might think that it is better to pay only £1.10 even if that involves condoning or hushing up all the irregularities in the formation of Cosach, rather than in the alternative pay the \$2.10 tax.

This is mere equivocation. The real facts are that the Law of July 21, 1930, passed by the Chilean Parliament which allowed the formation of Cosach, abolished the old export tax, which remains definitely abolished without any likelihood of being revived. It was not till some eight months later that the notorious Decree No. 12 of Feb. 24, 1931, instituted a new tax which is entirely a fresh imposition and in no sense a reduction of the rate of the old export tax abolished months before. This new tax of £1.10 per ton was ostensibly intended to secure bonds issued by Cosach in satisfaction of its debts to the Chilean Fiscus. To that extent it is legitimate and no one objects. By a little jugglery in the wording of the notorious decree, which has been exposed, the ostensible legitimate object was widened and the tax extended to secure any bonds which Cosach might issue to its own friends or other privileged persons in payment of its debts to them.

The result is as follows: Messrs. Guggenheim exercising their all-round control:

- (1) Get Cosach to assume Anglo-Chilean's debt to themselves.



*Chilean Government's Commission in its report attacks the claims of commercial superiority made for the Guggenheim Process. Belief is widespread, however, that the findings were designed more for political consumption than as a serious discussion of the respective merits of the Guggenheim and Shanks Processes. Right, the crystallization tanks at "Maria Elena" and above the primary crusher for the preliminary treatment of the "Caliche"*



(2) Then proceed to get themselves paid £5,577,724 in Cosach bonds in satisfaction of such debt.

(3) Nitrate companies are mulcted in taxation to pay off a debt really due to Guggenheim Brothers by Anglo-Chilean, in plain language a debt due to Guggenheim Brothers by themselves, and lastly.

(4) Lautaro's production being 60% of the total output, Lautaro pays 60% of a debt due between strangers.

The talk about a reduction of taxation having been secured and being in jeopardy as a consequence of the present agitation is simply absurd. There was no reduction. At the time of the transaction complained of there was no tax. Rather it is clear that when there was no tax, a fresh imposition was levied at the behest of Messrs. Guggenheim Brothers for their own personal advantage by a minister who has since been impeached before the Chilean Parliament. Let no one therefore imagine that the old export tax was or can be the alternative to acceptance of the present state of things with Cosach as it stands, and condonation or hushing up of all the attendant irregularities.

The old export tax is and remains abolished. The new tax is lawful so far as it is applied in payment of debts due to the State, but its suppression in so far as it is applied in satisfaction of the private claims of Messrs. Guggenheim Brothers and other privileged persons is but an act of elementary justice. Whatever debts may exist as between private parties should be paid by the debtors, not by the taxpayer.

E. A. Cappelen Smith asserts that no change can be made without a complete dissolution of Cosach. We entirely disagree with this statement and maintain that the gross irregularities committed can be rectified without going to a dissolution, which we have never desired."

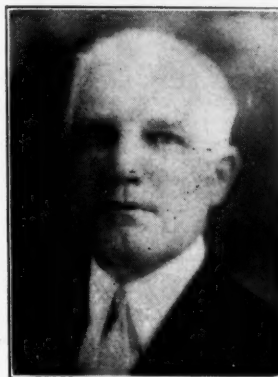
At the moment it is certain that the political, financial, and legal angles of the situation are at least of equal importance with the marketing and producing problems. They will have great bearing upon the competitive position of the natural material in its struggle with the synthetic but only for a short time. Some adjustments may be made to appease first, the politicians, and secondly, the stockholders of some of the companies absorbed into the larger unit, but very few basic changes are likely in the present set-up of the "Cosach". A united front is the first requisite in the struggle with the synthetic producers. All factions, in the final analysis, appreciate the necessity of subordinating their own interests to the common good. A long continuation of political instability in Chili is the most immediate threat to a settlement of these internal difficulties besetting the hard pressed nitrate industry.

#### Austin Co. Issues New Booklet

What factors should govern the general location of your plant? e. g., raw materials, labor laws, labor supply, freight rates, proximity to markets, fuel, power, water, tax rate, etc., this and 100 additional questions and their answers are contained in a new booklet issued by Austin Co., Cleveland, "101 Questions—That Should be Answered Before You Build", copies of which are available. Every executive in charge of construction, those who are about to build or contemplate doing so in the future will find much valuable thought and quite likely several ideas that will lead to important economies. A booklet that should be in the hands of every executive in the industry.

## Association News

Around bed-sides of two of the nation's sick industries, coal and fertilizer, gathered experts in November from the four quarters of the country to diagnose and prescribe. Seventh annual Southern convention, National Fertilizer Association was well attended. Principal speakers were: Bayles W. Haynes, president



Bayles W. Haynes

of the Association, Charles J. Brand, Hon. Charles S. Wilson, Federal Farm Board, and W. D. Anderson, president, Bibb Manufacturing Co., Macon, Ga.

"The capitalistic system is not breaking down nor does it need any substantial modification," said Mr. Anderson. "What course shall we take, if we are to depart from our old moorings? Certainly no intelligently constructive program has been proposed by the critics of the existing order." Mr. Anderson's subject was "What Price Socialism."

"In the final analysis agriculture must adjust its production to demand," declared Mr. Wilson, marketing expert. "When producers are well organized into cooperative associations—locals, regionals, and nationals—by commodities, they will be in a position to work out sound production programs and to carry these programs into effect."

Final sessions were devoted to round-table discussion of problems that have arisen as a result of reduced buying power of southern farmers, greater credit risks that must be assumed and lessened prospective demand for fertilizer for next season. Various discussions were led by some of the most capable sales executives in southern fertilizer industry.

#### Hale Addresses Coal Conference

"Plain speaking" as to responsibility for conditions in the bituminous coal industry came from Dow Organic Research Director, Dr. William J. Hale, former Michigan University Professor, proponent of revolutionary chemico-economic doctrine and author, "The Chemical Road to Progress," outstanding 1931 literary contribution for the solution of present economic situation (CHEMICAL MARKETS, July, p. 21).

Dr. Hale, presiding at sectional meeting on economic problems, declared that the only salvation for coal industry was to pour money without stint into its own researches.

"The coal industry must make up its mind to close half of its mines in every State," he said. "Let them stay closed. The Lord won't take them away."

"Form a trust organization so that everybody will have an interest in the remaining mines the way the oil industry in California has done and then do your research."

"Build your by-product plants close to the mines. Give up making products from complex processes and stick to the simple ones and you will have work for the miners night and day."

"We are all assuming that the hope of the coal industry lies in raising the price of coal. Exactly the opposite is the truth. I say the hope of the industry is in reducing prices. All basic products sell at constantly reducing prices as civilization advances and at advanced prices as it recedes."



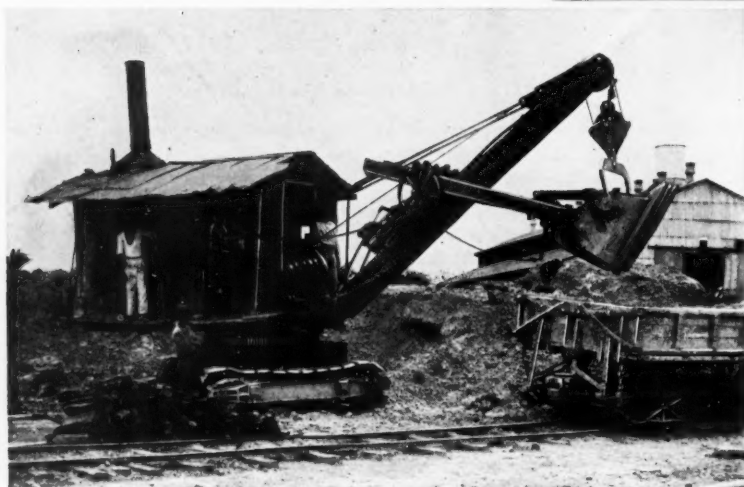
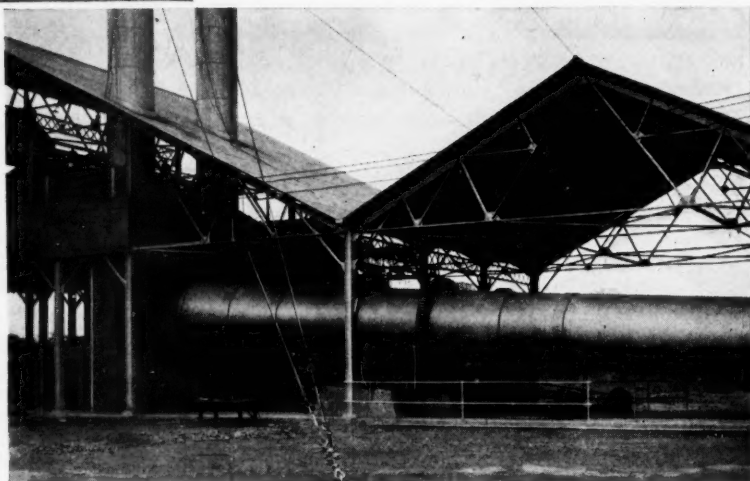
Dr. William J. Hale



## Bauxite Mining

**British and Dutch Guianas supply more than one-fifth of the world's production of this valuable ore.**

*Bauxite was first definitely identified in British Guiana in the nineties; in Dutch Guiana, in 1915. The fact that the bauxite hills are higher than the surrounding country was of great aid in carrying on the search for these deposits in the early days. Many of them were located by climbing high trees in the jungle, and from these vantage points spying out the country. Deposits in British and Dutch Guiana vary greatly in size, from small lenses up to areas several hundred yards wide and several miles long. Their thickness runs from six feet to about twenty-six feet. The texture of the ore is usually porous or cellular. Above, drilling bauxite for blasting at Moengo mine, Dutch Guiana. Three feet an hour is the average progress for one man*

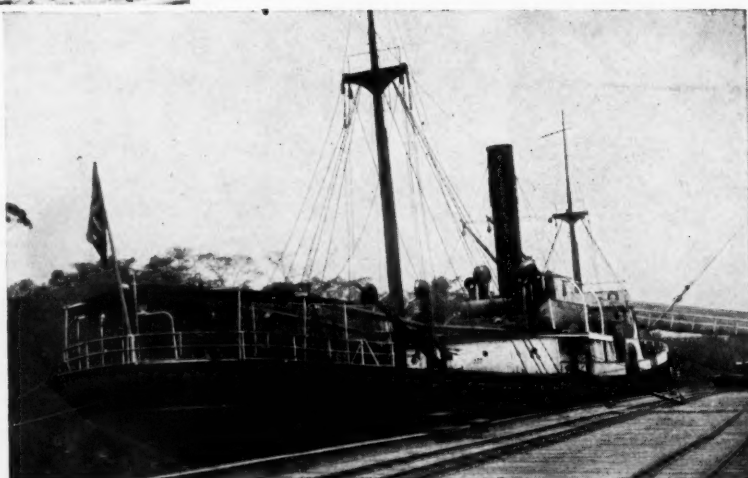


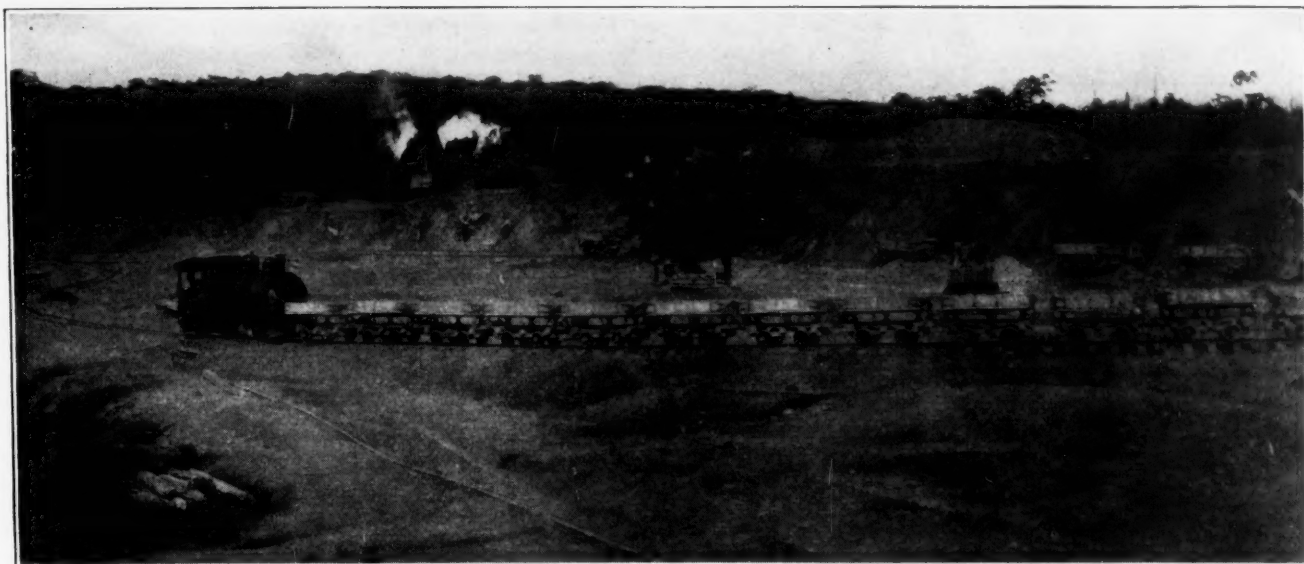
*The surface of the Moengo bauxite deposit is usually hard, which facilitated cleaning off the overburden in the early days. Where the overburden—loose soil—is not more than four feet thick, the present practice is to clean the ground surface of plant growth, stumps and roots, proceed with the blasting and then load the bauxite, overburden and all, with steam shovels (left) into the mine cars, depending upon the mill to separate waste material from the bauxite. Two rotary kilns constitute the drying equipment at Moengo mine. Each has a capacity of about 28 tons of dried ore per hour*

*Mining operations have undergone tremendous advances in technique, principally in the substitution of hand labor for mechanical handling. The aluminum Co. of America owner of the mines has spared no expense in making the living conditions satisfactory*

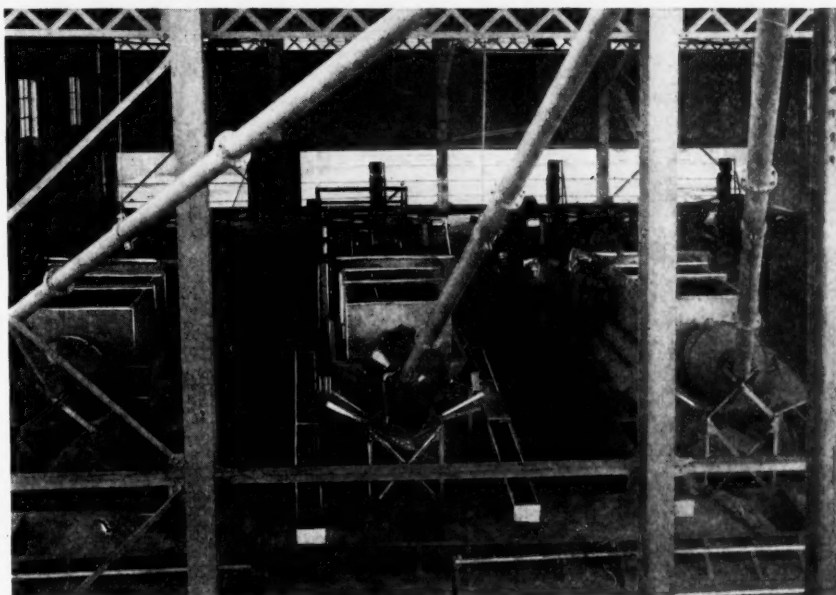
*Right—A vessel tied up at the dock to get a load of bauxite. About 525 tons can be transferred to the ship in one hour. The average load is 2,642 tons. Close control is maintained over all operations from the time an ore body is explored until the washed and dried bauxite is passed into the hold of the vessel which will carry it to market. Samples of ore are frequently taken at various stages of the mining and milling processes, and these are carefully analyzed in well-equipped laboratories by competent chemists*

*—Photographs courtesy E. I. du Pont de Nemours Co., and Du Pont Magazine*





Above—General view of the Three Friends mine in British Guiana. Note the stripping operations being carried on in the background. After blasting, the operations in the two mines are practically the same. The ore is taken in side-dump cars to the unloading building, (picture lower right hand corner) dumped into a large hopper, elevated to a trommel screen with two-inch circular openings, and washed by jets of water while passing through the screen. The undersize goes to the collecting dump; the oversize to a crusher. After repeated washings and crushings, it is taken to drying kilns where all but a small percentage of the free moisture is driven off. Next, it is discharged into a carrier to cool, and then stored. About 70 per cent of all material mined is recovered as crushed, washed and dried ore.



Right—The washing plant at the Moengo mine, with Dorr rake classifiers in the foreground and below—Taking the tailings from the washer into the jungle. They cannot be discharged into the river because of the danger of forming bars and shallows



The unloading building, where bauxite is dumped from mine cars and lifted by a conveyor to a screen for washing



# An Inventory of the Fixed Nitrogen Capacity

By Joseph Kalish

FROM a modest beginning, the synthetic ammonia industry, eked out by the earlier Caro-Franck cyanamide process, enabled Germany to withstand a nitrate blockade for four war years. Afterwards, world licensing under Badische patents, as well as individual invention stemming from the Haber-Bosch original, caused a wild scurry of construction, each nation striving for nitrogen independence. This frenzy has now abated, possibly temporarily, with world productive capacity at approximately three million tons of fixed nitrogen annually, contrasted with consumption of only some two million tons. In addition is the yearly Chile nitrate capacity of about half a million tons of nitrogen, and a variable output of by-product ammonia and sulfate.

Six synthetic ammonia processes are now in use, all depending upon the combination of purified hydrogen and nitrogen under pressure in the presence of a catalyst. The original source of hydrogen was water gas, but hydrogen from coke ovens is now largely used, undesirable constituents being removed by liquefaction and nitrogen obtained by the Linde or Claude liquefaction and fractionation processes. Where coal costs more than electric power, water is the source of hydrogen through electrolysis. Burning excess hydrogen in air produces the necessary nitrogen by the removal of oxygen. Hydrogen is also obtained, for small plants, as a by-product of various manufactures, *i. e.* caustic soda, sodium, phosphorus, but one plant built to use hydrogen from a fermentation process now manufactures methanol, utilizing two

constituents of the waste gases instead of one. Finally, a plant now building in California will use natural gas as a source of hydrogen.

Considering the most suitable processes and hydrogen sources, the economic choice is obscured in most instances by extraneous factors, such as patents, type and cost of power available, limitations of plant size through capital available, etc. Thus, at first glance, the Haber-Bosch process, utilizing water and producer gas, seems most favored, as 55.8 per cent of world capacity so operates with 59.8 per cent utilizing water gas. However, there are included in these percentages four plants with combined capacity of 1,300,000 tons of fixed nitrogen which are direct results of developments when the Haber-Bosch process was the only one available. Haber-Bosch accounts for 55.8 per cent of present total capacity, but actually only eight plants or 9.2 per cent, are now operating in only five countries. Casale operation, second in capacity (16.2 per cent of the total) is first with respect to the number of plants (twenty-six or 29.6 per cent) and its use is most widely disseminated, in twelve countries. Next in order are the Fauser process with 9.3 per cent capacity, and fourteen plants or 15.9 per cent, in eight countries, and the Claude process with 8.5 per cent of capacity, but twenty plants or 22.7 per cent, operating in nine countries. The American or Nitrogen Engineering Corporation process is used for only 4.0 per cent of world capacity, but there are thirteen plants, or 14.8 per cent, operating in eight countries.

Table 1 Synthetic Ammonia By Processes and Sources of Hydrogen  
in metric tons of nitrogen

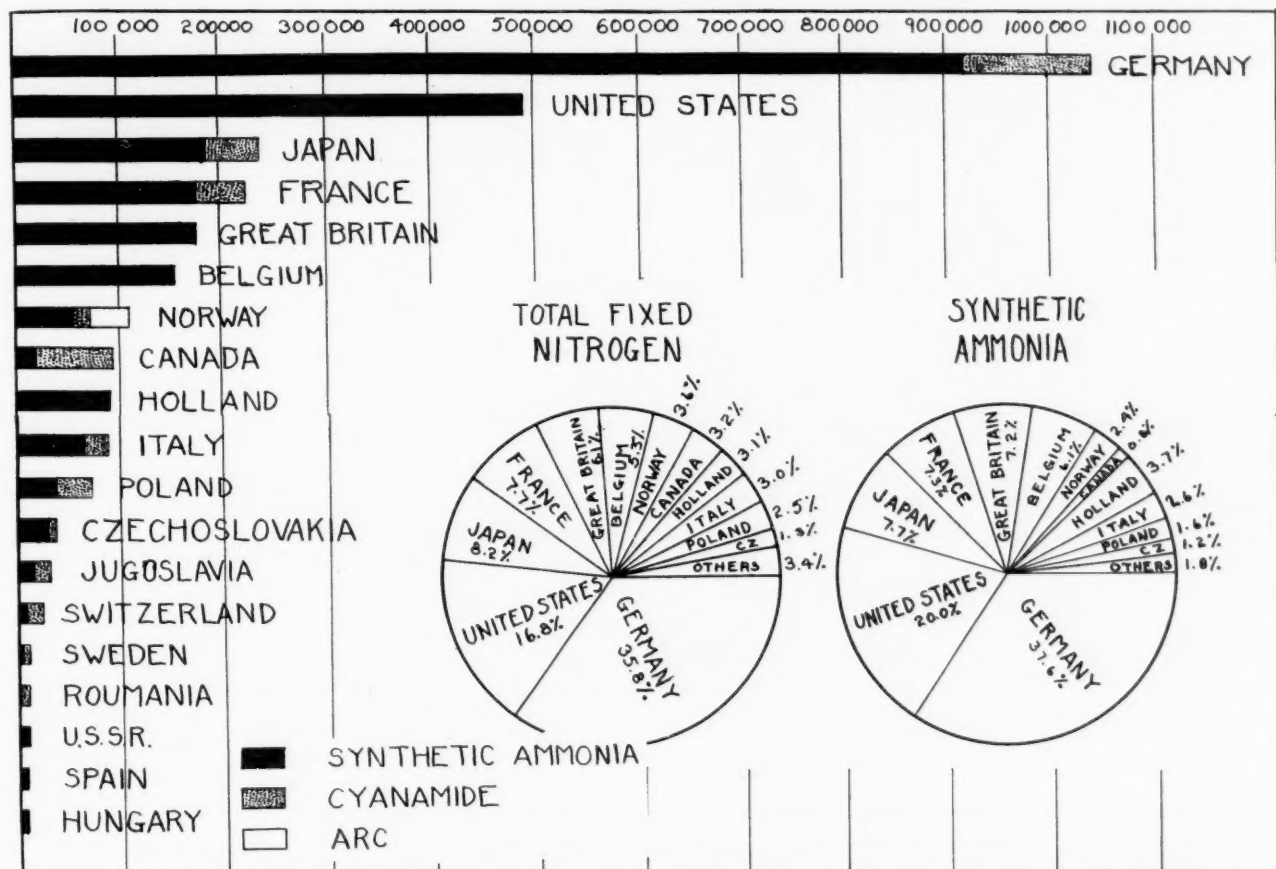
Source	Haber Bosch		Casale		Fauser		Claude		Mont Cenis		N. E. C.		Not Specified		Total	
	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.
Water Gas.....	6	1,308,000	2	57,500	1	20,000	3	54,000	—	—	3	21,000	—	—	15	1,460,500
Coke Oven.....	—	—	13	158,000	4	135,000	14	138,000	3	90,000	4	59,000	1	6,000	39	586,500
Electrolysis.....	1	54,000	8	173,500	8	70,000	1	14,000	—	—	2	4,500	—	—	20	316,000
Natural Gas.....	—	—	—	—	—	—	—	—	1	20,000	—	—	—	—	1	20,000
By-Product.....	1	1,500	3	6,000	1	2,500	2	2,000	—	—	3	7,500	1	2,500	11	22,000
Not Specified....	—	—	—	—	—	—	—	—	—	—	1	6,000	1	30,000	2	36,000
Total.....	8	1,363,500	26	395,000	14	227,500	20	208,000	4	110,000	13	98,500	3	38,500	88	2,441,000

The newest Mont Cenis process is so far used in only four plants in three countries.

Although water gas supplies 59.8 per cent of the hydrogen for nitrogen fixation, this capacity is distributed among only fifteen plants in seven countries. Coke oven hydrogen, not utilized at all in the United States, nevertheless is second in capacity, at 24.0 per cent and first in number of plants, thirty-nine in

chemische G.m.b.H. at Hirschfelde, an experimental plant of small capacity; Lonza-Werke at Waldshut, with a capacity of 60,000 tons cyanamide; and Bayerische Stickstoff Werke at Trostberg and Piesteritz. Electricity at these last locations is from water power, and nitrogen obtained by the Linde process. Piesteritz has fourteen large carbide furnaces as well as equipment for the manufacture of ammonia and

Synthetic Nitrogen Capacity 1930  
Metric Tons



ten countries. Electrolytic hydrogen is used in twenty plants in ten countries; while by-product hydrogen, utilized in eleven plants in seven countries, is limited to small installations, averaging fixation capacities of approximately 2,000 tons annually.

G. P. Politt, in a paper read before the World Power Conference, 1930 gives very interesting cost data.

Other estimates for German fixation costs include 42 pfennig (10.1 cents) per kilo fixed nitrogen in ammonium sulfate by the Haber-Bosch process; 39 to 40 pfennig (9.4 to 9.6 cents) in ammonium sulfate from coke oven gas; and 61 pfennig (14.6 cents) per kilo nitrogen fixed in cyanamide. In Japan costs of direct synthetic ammonium sulfate have been placed at 71 yen (\$35.50) per ton contrasted with 88 yen (\$44.00) for ammonium sulfate from cyanamide.

*Germany:* Capacity now totals over one million tons of nitrogen annually, of which the arc process is responsible for 2,000 tons and the cyanamide process 119,000 tons. Cyanamide plants include the Elektro-

nitrate salts. The I. G. cyanamide plant at Knapsack generates electricity from lignite and has seven carbide furnaces and eight nitriding ovens.

The monstrous works at Merseburg are marvelously efficient, consume 20,000 tons of lignite daily, and take 20,000 cubic meters of water hourly from the Saale River. Recovery of by-product sulfur amounts to thirty tons daily, and the sulfate radical in ammonium sulfate comes from anhydrite. Half of the fixed nitrogen is utilized in the production of fertilizers while the rest is shipped as anhydrous ammonia. Merseburg and Oppau productions are also processed by I. G. plants at Hoechst, Wolfen, Bitterfeld, Gerthe (Westphalia) and Piesteritz. The Leuna plant also operates the Bergius hydrogenation process and makes synthetic methanol.

A Mont Cenis plant at Herne was licensed July 1930 and shut down the following January by the I. G. which assumed the Syndicate quota. The Scholven plant was begun in 1929 and completed in 1930 at a cost of 28,000,000 R. M. (\$7,000,000).

*Synthetic Nitrogen Capacity, Leading Countries of the*

**Synthetic Nitrogen, Capacity  
Metric Ton, Nitrogen Annual**

Location	Company	Process	Capacity	Hydrogen
<b>GERMANY</b>				
Merseburg.....	I. G. Farbenindustrie, A.-G.	Haber-Bosch	625,000	Water and Producer Gas
Oppau.....	" " "	" "	125,000	" " " "
Herne-Sodingen.....	Gasverarbeitungs, G.m.b.H., Hibernia	Mont Ceniz	55,000	Coke Oven
Scholven.....	Bergwerks A.-G., Recklinghausen	" "	20,000	" "
Sterkrade-Holten.....	Ruhrchemie, A.-G.	Casale	35,000	" "
Herten, Westphalia.....	Gewerkschaft, Ewald	N. E. C.	22,500	" "
Waldenburg, Silesia.....	Stickstoffwerke, A.-G.	"	22,500	" "
Rauxel.....	Gewerkschaft, Victor	Claude	12,000	" "
Sonderhausen.....	Kali-Kloeckner	"	"	" "
Piesteritz.....	Bayerische Stickstoffwerke, A.-G.	Fauser	2,500	By-Product Phosphorus
Trostberg.....	" " "	Cyanamide	45,000	
Piesteritz.....	" " "	"	45,000	
Knapsack.....	A.-G. f. Stickstoffdunger	"	15,000	
Waldshut.....	Lonza-Werke, A.-G.	"	13,000	
Hirschfelde.....	Elektrochemische G.m.b.H.	"	1,000	
Rhina.....	Elektro-Nitrum, A.-G.	Arc	2,000	
	Total German Capacity		1,040,500	
	Synthetic Ammonia		919,500	
	Cyanamide		119,000	
	Arc		2,000	
<b>UNITED STATES</b>				
Hopewell, Va.....	Atmospheric Nitrogen	Haber-Bosch	350,000	Water Gas
Syracuse, N. Y.....	" "	" "	8,000	" "
Belle, W. Va.....	Du Pont	Claude, Casale	100,000	" "
Seattle, Wash.....	" "	N. E. C.	1,000	Electrolysis
Niagara Falls, N. Y.....	" "	" " "	2,500	By-Product
Niagara Falls, N. Y.....	Mathieson Alkali	" " "	3,500	" "
Pittsburg, Cal.....	Great Western Electrochemical	Haber-Bosch	1,500	" "
Pittsburg, Cal.....	Shell Chemical	Mont Ceniz	20,000	Natural Gas
Midland, Mich.....	Midland Ammonia	"	2,500	By-Product
	Total U. S. Capacity		489,000	
<b>JAPAN</b>				
Kanto, Chosen.....	Nippon Chisso Hiryo K. K.	Casale	90,000	Electrolysis
Minamata.....	" " " "	"	30,000	"
Nobiaka.....	" " " "	"	18,000	"
Omuda, Kyushu.....	Miike Nitrogen Industry	Claude	6,000	Coke Oven
Hikoshima.....	Shiki Chisso Hiryo K. K.	"	2,500	Water Gas
Hayaboshi.....	Dai Nippon Jinzo Hiryo K. K.	Fauser	5,000	Electrolysis
Niihama.....	Sumitomo Hiryo Seitoho	N. E. C.	6,000	
Kawasaki.....	Showa Hiryo K.K.	"	30,000	
Tanga.....	" " "	Cyanamide	2,000	
Omi.....	Denki Kagaku Kogyo	"	12,000	
Omuda.....	" " " "	"	10,000	
Niigate.....	Hokuetsu Suiryoku Denki K. K.	"	9,000	
Naoetsu.....	Shinetsu Chisso Hiryo K. K.	"	6,000	
Takefu.....	Daido Hiryo K. K.	"	5,000	
Namerigawa.....	Ho Kuriko Denki K. K.	"	1,000	
Kagemori.....	Kanto Suiden	"	1,000	
Minamate.....	Nippon Chisso Hiryo K. K.	"	5,000	
	Total Japanese Capacity		238,500	
	Synthetic Ammonia		187,500	
	Cyanamide		51,000	
<b>FRANCE</b>				
Toulouse.....	Office National de l'Azote	Haber Bosch	25,000	Water Gas
Toulouse.....	" " " "	Casale	5,000	Coke Oven
Firminy.....	Prod. Chim. Roche-Moliere	"	7,000	" "
Marles.....	Marles-Kuhlmann	"	7,000	" "
Anzin.....	Anzin-Kuhlmann	"	7,000	" "
Lens.....	Mines de Lens	"	6,000	" "

*World, Expressed in Annual Metric Tons of Nitrogen*

Location	Company	Process	Capacity	Hydrogen
Carling .....	Soc. Houillere Sarre et Moselle	"	4,500	" "
Henin Lietard .....	Soc. Mines de Dourges	"	4,500	" "
Drocourt-Vicoigne .....	Cie. Mines Noeux	"	4,500	" "
St. Auban .....	Alais, Froges, Camargue	"	3,500	By-Product
Lille .....	Kuhlmann	N. E. C.	10,000	Water Gas
Courrieres .....	Courrieres-Kuhlmann	N. E. C.	7,000	Coke Oven
Waziers .....	Soc. Mines Aniche	Claude	23,000	" "
Bully-Grenay .....	Cie. Mines Bethune	"	20,000	" "
Grand-Quevilly .....	Grande-Paroisse	"	17,000	" "
Soulom .....	Phosphates Tunisiens	"	14,000	Electrolysis
Lievin .....	L' Ammoniaque de Lievin	"	6,000	Coke Oven
Decazeville .....	Commentry, Fourchambault, Decazeville	"	3,000	" "
Meons .....	Soc. Houillere St. Etienne	"	1,500	" "
Monterau .....	Grande Paroisse	"	1,500	Water Gas
Lannemezan .....	Soc. Produits Azotés	Cyanamide	15,000	
Bellegarde .....	" " "	"	5,000	
Lens .....	Mines de Lens	"	8,000	
Marignac .....	Cie. Elect. Ind. Marignac	"	7,000	
Brignoud .....	Fredet-Kuhlmann	"	6,000	
Modane .....	St. Gobain	"	4,000	
Pierrefitte .....	Phosphates Tunisiens	Arc	1,000	
Roche de-Rame .....	La Nitrogene	Arc	500	
Total French Capacity			223,500	
Synthetic Ammonia			177,000	
Cyanamide			45,000	
Arc			1,500	
<b>GREAT BRITAIN</b>				
Billingham .....	Imperial Chemical Ind.	Haber-Bosch	175,000	Water Gas
Widnes .....	" " "	Casale	1,000	By-Product
Total British Capacity			176,000	
<b>BELGIUM</b>				
Ressaix .....	Centrale du Centre	Fausser	40,000	Coke Oven
Willebroeck .....	Soc. Amm. Synth. et Deriv.	"	20,000	" "
Tertre .....	Carbochimique	Casale	26,500	" "
Louviere .....	Soc. Fabric. Engr. Azotes	"	20,000	" "
Salzaete .....	Soc. Fours-a-Coke Salzaete	"	17,500	" "
Ostend .....	Union Chimique Belge	"	13,500	" "
Ougrée .....	Prod. Chim. Meuse	N. E. C.	7,500	" "
Ougrée .....	Soc. Belge Azote	Claude	5,000	" "
Ghent .....	Centr. Elect. Flanders	Cyanamide	4,000	
Total Belgian Capacity			154,000	
Synthetic Ammonia			150,000	
Cyanamide			4,000	
<b>NORWAY</b>				
Rjukan .....	Norsk. Hydro.	Haber-Bosch	54,000	Electrolysis
Rjukan .....	" "	Arc	31,000	
Notodden .....	" "	N. E. C.	3,500	Electrolysis
Notodden .....	" "	Arc	8,000	
Odda .....	Odda Smelteverke	Cyanamide	15,000	
Total Norwegian Capacity			111,500	
Synthetic Ammonia			57,500	
Cyanamide			15,000	
Arc			39,000	
<b>CANADA</b>				
Traill, B. C. ....	Consolidated Smelting and Refining	Fausser	17,500	Electrolysis
Sandwich, Ont. ....	Canadian Industries	Casale	1,500	By-Product
Niagara Falls, Ont. ....	American Cyanamid	Cyanamide	75,000	
Total Canadian Capacity			94,000	
Synthetic Ammonia			19,000	
Cyanamid			75,000	

Location	Company	Process	Capacity	Hydrogen
<b>HOLLAND</b>				
Sluiskill .....	Cie. Neerland, Azote	Fauser	45,000	Coke Oven
Haarlem .....	Lutterade bei Sithard	"	30,000	" "
Ijmuiden .....	MEKOG	Mont Cenis	15,000	" "
	Total Dutch Capacity		90,000	
<b>ITALY</b>				
Meran .....	Soc. Alto Adigo Amm.	Fauser	21,000	Electrolysis
Cotrone .....	Soc. Merid. Amm.	"	14,500	"
Novara .....	Soc. Piemontese Amm.	"	4,500	"
Oschiri .....	Soc. Sard. Amm.	"	3,000	"
Mas .....	Soc. Ital. Amm.	"	1,000	"
Nera Montero .....	Soc. Ind. Elittr.	Casale	8,500	"
Terni .....	" " "	"	4,500	"
Busi .....	Soc. Azugeno	Claude	1,500	Coke Oven
Vado Ligura .....	" " "	"	6,000	" "
Collestatte .....	Soc. Ind. Elittr.	Cyanamide	10,000	
Ascoli-Piceno .....	Soc. Ind. Carburo	"	5,000	
Narni .....	Soc. Ind. Elittr.	"	3,500	
Domodossola .....	Soc. Ital. Prod. Azot.	"	3,500	
San Marcelo .....	" " " "	"	1,000	
	Total Italian Capacity		87,500	
	Synthetic Ammonia		64,500	
	Cyanamide		23,000	
<b>POLAND</b>				
Tarnow .....	Stickstoffwerke in New Chorzow	Fauser	20,000	Water Gas
Chorzow .....	Chorzower Stickstoff Fabrik	N. E. C.	7,500	" "
Wyry .....	Oberschles. Sprengstoff.	"	3,500	" "
Knurow .....	Soc. Ferm. Mines Fisc.	Claude	7,000	Coke Oven
Chorzow .....	Chorzower Stickstoff Fabrik	Cyanamide	35,000	
Jaworzno .....	Azot. A. G Bary	Arc	500	
	Total Polish Capacity		73,500	
	Synthetic Ammonia		38,000	
	Cyanamide		30,000	
	Arc		500	
<b>CZECHOSLOVAKIA</b>				
Mährisch-Ostrau .....	C. Z. Stickstoffwerke	Claude	27,000	Coke Oven
Aussig .....	Aussiger Verein	"	1,000	By-Product
Aussig .....	" "	N. E. C.	1,500	" "
Falkenan .....	" "	Cyanamide	8,000	
	Total Czechoslovak Capacity		37,500	
	Synthetic Ammonia		29,500	
	Cyanamide		8,000	
<b>JUGOSLAVIA</b>				
Almissa .....	Soc. Util. Forz. Dalmaz	Casale	14,000	Electrolysis
Almissa .....	" " " "	Cyanamide	7,000	
Ruse .....	Osterwisch. Stickstoffwerke	"	6,000	
Sebenico .....	Phosphates Tunisiens	"	5,000	
	Total Jugoslavian Capacity		32,000	
	Synthetic Ammonia		14,000	
	Cyanamide		18,000	
<b>SWITZERLAND</b>				
Visp .....	Lonza Werke	Casale	6,500	Electrolysis
Martigny .....	" "	Cyanamide	12,000	
Gampel .....	" "	"	4,000	
	Total Swiss Capacity		22,500	
	Synthetic Ammonia		6,500	
	Cyanamide		16,000	

Location	Company	Process	Capacity	Hydrogen
<b>SWEDEN</b>				
Ljunga.....	Stockholms Super. Fabriks	Fausser	3,500	Electrolysis
Alby.....	" " "	Cyanamide	7,000	
	Total Swedish Capacity		10,500	
<b>ROUMANIA</b>				
Dicio San Martin....	Stickst. Kunstd. Chem. Ind.	Cyanamide	8,000	
<b>U. S. S. R.</b>				
Nizhni-Novgorod.....	Sevkhimtrest	Casale	7,500	Water Gas
<b>SPAIN</b>				
Oviedo.....	Soc. Iberic. Nitro.	Claude	3,000	Coke Oven
Flix.....	" " "	"	1,000	By-Product
Sobinanigo.....	Soc. Energ. Ind. Aragonesas	Casale	2,000	Electrolysis
	Total Spanish Capacity		6,000	
<b>HUNGARY</b>				
Pet.....	Ungacheris Ammonifabrik	—	6,000	Coke Oven
	World Total Capacity		2,938,000	
	Synthetic Ammonia		2,441,000	
	Cyanamide		424,000	
	Arc		43,000	

Plans to increase capacity to 30,000 tons in 1932 are reported. Ruhr Chemie plant at Holten uses coke oven gas. Operations began May 1929, and the factory includes a 13,000 K.W.H. power house and equipment for the production of ammonium sulfate, nitric acid, and ammonium sulfate nitrate. The company borrowed \$8,000,000 in the United States in 1928 and \$3,000,000 in 1929.

Stickstoffwerke A. G. plant at Waldenburg, Silesia (Prince of Pless interests) went into receivership December 1930 although the eastern location was supposed to give a favorable freight rate in supplying farmers. Gewerkschaft Ewald in Herten, Westphalia operates an American process and recovers sulfur by the C. A. S. process. Potash interests are involved in Gewerkschaft Victor.

*United States:* The Syracuse plant of the Atmospheric Nitrogen Corporation is a result of war-time attempts of the General Chemical Co. to devise a satisfactory synthetic ammonia process. Although now reported to be reserved for experimental purposes, it is the forerunner of the present Hopewell giant. Hopewell represents an investment reputed to be about \$80,000,000 and manufactures liquid ammonia and sodium nitrate part of the latter now being exported.

The du Pont plant at Belle consists of Claude and Casale units and methanol is produced as a by-product of gas purification. In addition are du Pont controlled plants at Niagara Falls and Seattle.

Mathieson Alkali, using electrolytic hydrogen at Niagara Falls, operates a small ammonia unit as does the Great Western Electrochemical Co. at Pittsburgh, Cal. The Midland Ammonia Company at Midland,

Michigan is erecting a synthetic ammonia plant. Shell Chemical Co., subsidiary of Shell Oil, is erecting a plant on a 600 acre site at Pittsburg, Cal. and is expected to utilize natural gas as a source of hydrogen. The installation is to cost about \$3,000,000.

*Japan:* First using the cyanamide process, this country now operates synthetic ammonia plants with hydrogen mainly obtained electrolytically. The Miike Nitrogen Industry Co., Ltd., with a capital of 10,000,000 yen (\$5,000,000) was formed jointly by the Mitsui Mining Co. and the Electrochemical Co. and will increase its capacity 90,000 tons ammonium sulfate annually. The Showa plant at Kawasaki has now completed more than half of its six units.

*France:* The most important French companies are Etablissements Kuhlmann, controlling licenses for the N. E. C. and Casale processes; Alais, Froges and Camargue; St. Gobain; and L'Air Liquid. The Toulouse plant, government owned, uses the Casale and Haber processes and includes eight principal buildings, three 25,000 cubic meter gasometers, facilities, to store 120 metric tons of liquid ammonia and a 10,000 cubic meter ammonia gasometer. A silo 130 meters long and 30 meters wide has a capacity of 30,000 metric tons of ammonium sulfate. Smaller units are included for the production of ammonium nitrate, ammonium sulfate-nitrate, ammonitrite, nitropotasse, etc. The Waziers plant, Mines d'Aniche, is controlled by St. Gobain interests. It began operations in November, 1925 and has since increased capacity twice. Part of the ammonia production goes to a St. Gobain plant to make 40 tons of 36 per cent nitric acid daily. The plant at Soulom oxidizes some of its ammonia to calcium nitrate and ships the rest

to Pierrefitte where there is a pyrolytic plant producing phosphoric acid and ferrophosphorus and where ammonium phosphate is produced. Cyanamide has been manufactured at Lannemezan in Haute Pyrenees since 1917. The plant has thirty 2,000 K.W. carbide furnaces and obtains power from the hydroelectric plants of Bordere and Loudenvielle. Bellegarde, the second French cyanamide plant, operating since 1913, uses its own water power and purchases some. The newest cyanamide plant, Mines de Lens, began operations near the end of 1930. It has two lime kilns with a daily capacity of 120 metric tons and two Miguet type electric furnaces with an annual capacity of 30,000 tons of calcium carbide.

**Table 2**

	% Total		
	Capacity	No. Plants	Av. Capacity
Haber Bosch.....	55.8	9.2	170,500
Casale.....	16.2	29.6	15,200
Fausser.....	9.3	15.9	16,100
Claude.....	8.5	22.7	10,400
Mont Ceniz.....	4.5	4.5	27,500
N. E. C.....	4.0	14.8	7,600
Not Specified.....	1.7	3.3	13,000

**Belgium:** S. A. Centrale plant under construction at Ressaix was founded with the participation of Evence Coppee, Montecatini, Charbonnages de Ressaix, Houillieres d'Anderlus and Charbonnages de Rieux de Coeur. It has a capital of 126,500,000 francs (\$5,000,000). The Willebroeck plant receives its coke oven gas from Evence Coppee while Soc. Carbonization Central supplies the gas to the Tertre plant. The Louviere plant (Solvay interests) is associated with the coke ovens of Usines Boel. The Salzaete and Ougree plants are backed by Kuhlmann while the Societe Belge d'Azote with a plant at Ougree is backed by L'Air Liquid, Grand Paroisse and Huttenkonzern Ougree Marihaye. Belge de l'Azote is also interested in the Ghent cyanamide plant.

**Norway:** Norsk Hydro plants still continue their are manufactures but now fix more nitrogen through synthetic ammonia with electrolytic hydrogen. Installation at Rjukan includes 324 Pechkranz electrolyzers with a capacity of 700,000 cubic feet of hydrogen and 350,000 cubic feet of oxygen hourly, Linde nitrogen and ammonia oxidation units. The cyanamide plant at Odda began operations in 1910 and uses

150,000 tones of limestone, 50,000 tons of English anthracite, and 15,000 tons of gas coke annually. Equipment includes twelve old carbide furnaces (7 to 8 tons calcium carbide daily) and ten new ovens (16 to 18 tons carbide daily).

**Canada** appears high on the list of nitrogen fixing countries only by virtue of the American Cyanamid Co. plant built in 1909 and since enlarged to its present capacity of 350,000 tons calcium cyanamide annually. The plant manufactures ammonia, nitric acid, ammonium nitrate, ammonium sulfate, urea and cyanides. Electrolytic hydrogen at the Traill plant requires 131.7 K.W.H. per 1,000 cubic feet of hydrogen.

**Holland:** The state plant at Haarlem cost 12,500,-000 gulden (\$4,000,000) and was allotted 26,000 tons annually by the international syndicate. MEKOG (Maatschappij tot Exploitatie van Kooksoven Gassen) was established through the participation of Royal Netherlands Blast Furnaces and Royal Dutch Petroleum (Shell) while the Dutch Nitrogen Co., with plant at Sluiskill, capital 157,500,000 francs (\$6,300,-000) is controlled by Montecatini, Banca Commerciale Italiana, Banque de Bruxelles and Evence Coppee.

**Table 3**

	% Total		
	Capacity	No. Plants	Av. Capacity
Water Gas.....	59.8	17.0	97,400
Coke Oven.....	24.0	44.3	15,000
Electrolysis.....	12.9	22.8	15,800
Natural Gas.....	0.8	1.1	20,000
By-Product.....	0.9	12.5	2,000
Not Specified.....	1.6	2.3	18,000

**Italy,** lacking coal, depends upon electric power for 80,000 of its 87,500 tons of fixed nitrogen capacity. Montecatini controls 44,000 tons of this, using the Fausser process and 4,500 tons cyanamide capacity, Terni capacity is 13,000 tons Casale and 13,500 cyanamide, while Societa Azogeno uses coke oven gas and the Claude process for 7,500 tons. The Italian synthetic ammonia industry had its beginning in 1921 with the erection of a plant at Novara by Montecatini and one at Terni by the Terni group. These plants began operations in 1923 and each year since has witnessed expansion.

**Table 4 Synthetic Ammonia Processes**

Country	Haber Bosch		Casale		Fausser		Claude		Mt. Ceniz		N. E. C.		Not Spec.		Total	
	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.
Germany.....	2	750,000	1	35,000	1	2,500	1	12,000	2	75,000	2	45,000	—	—	9	919,500
United States....	3	359,500	1	50,000	—	—	1	50,000	1	20,000	3	7,000	1	2,500	10	489,000
Japan.....	—	—	3	138,000	1	5,000	2	8,500	—	—	1	6,000	1	30,000	8	187,500
France.....	1	25,000	9	49,000	—	—	8	86,000	—	—	2	17,000	—	—	20	177,000
Great Britain....	1	175,000	1	1,000	—	—	—	—	—	—	—	—	—	—	2	176,000
Belgium.....	—	—	4	77,500	2	60,000	1	5,000	—	—	1	7,500	—	—	8	150,000
Norway.....	1	54,000	—	—	—	—	—	—	1	3,500	—	—	—	—	2	57,500
Canada.....	—	—	1	1,500	1	17,500	—	—	—	—	—	—	—	—	2	19,000
Holland.....	—	—	—	—	2	75,000	—	—	1	15,000	—	—	—	—	3	90,000
Italy.....	—	—	2	13,000	5	44,000	2	7,500	—	—	—	—	—	—	9	64,500
Poland.....	—	—	—	—	1	20,000	1	7,000	—	—	2	11,000	—	—	4	38,000
Czechoslovakia..	—	—	—	—	—	—	2	28,000	—	—	1	1,500	—	—	3	29,500
Jugoslavia.....	—	—	1	14,000	—	—	—	—	—	—	—	—	—	—	1	14,000
Switzerland.....	—	—	1	6,500	—	—	—	—	—	—	—	—	—	—	1	6,500
Sweden.....	—	—	—	—	1	3,500	—	—	—	—	—	—	—	—	1	3,500
U. S. S. R.....	—	—	1	7,500	—	—	—	—	—	—	—	—	—	—	1	7,500
Spain.....	—	—	1	2,000	—	—	2	4,000	—	—	—	—	—	—	3	6,000
Hungary.....	—	—	—	—	—	—	—	—	—	—	—	—	1	6,000	1	6,000
Total.....	8	1,363,500	26	395,000	14	227,500	20	208,000	4	110,000	13	98,500	3	38,500	88	2,441,000

Country	Water Gas		Coke Oven		Electrolysis		Natural Gas		By-Product		Not Spec.		Total	
	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.	No.	Cap.
Germany.....	2	750,000	6	167,000	—	—	—	—	1	2,500	—	—	9	919,000
United States...	4	458,000	—	—	1	1,000	1	20,000	4	10,000	—	—	10	489,000
Japan.....	1	2,500	1	6,000	4	143,000	—	—	—	—	2	36,000	8	187,500
France.....	3	36,500	15	123,000	1	14,000	—	—	1	3,500	—	—	20	177,000
Great Britain...	1	175,000	—	—	—	—	—	—	1	1,000	—	—	2	176,000
Belgium.....	—	—	8	150,000	—	—	—	—	—	—	—	—	8	150,000
Norway.....	—	—	—	—	2	57,500	—	—	—	—	—	—	2	57,500
Canada.....	—	—	—	—	1	17,500	—	—	1	1,500	—	—	2	19,000
Holland.....	—	—	3	90,000	—	—	—	—	—	—	—	—	3	90,000
Italy.....	—	—	2	7,500	7	57,000	—	—	—	—	—	—	9	64,500
Poland.....	3	31,000	1	7,000	—	—	—	—	—	—	—	—	4	38,000
Czechoslovakia..	—	—	1	27,000	—	—	—	—	2	2,500	—	—	3	29,500
Jugoslavia.....	—	—	—	—	1	14,000	—	—	—	—	—	—	1	14,000
Switzerland.....	—	—	—	—	1	6,500	—	—	—	—	—	—	1	6,500
Sweden.....	—	—	—	—	1	3,500	—	—	—	—	—	—	1	3,500
U. S. S. R.....	1	7,500	—	—	—	—	—	—	—	—	—	—	1	7,500
Spain.....	—	—	1	3,000	1	2,000	—	—	1	1,000	—	—	3	6,000
Hungary.....	—	—	1	6,000	—	—	—	—	—	—	—	—	1	6,000
Total.....	15	1,460,500	39	586,000	20	316,000	1	20,000	11	22,000	2	36,000	88	2,441,000

Table 5 Synthetic Ammonia Sources of Hydrogen

*Poland:* The Tarnow plan was erected at a cost of \$11,200,000 (95,000,000 zlotys). The cyanamide plant at Chorzow has seven carbide furnaces with a daily capacity of 275 tons, and forty autoclaves for hydrolysis to ammonia. The Linde process produces the necessary nitrogen. The arc installation manufactures cyanides and ferrocyanides.

*Other countries:* The Falkenau cyanamide plant in Czechoslovakia, which consumes 11 K.W.H. electric current per kilo nitrogen fixed in cyanamide, receives power from lignite as fuel. Until 1928, Czechoslovakia had no plant except this, belonging to Aussiger Verein, but in that year the Mährisch-Ostrau plant of the Czechoslovak Nitrogen Works acquired Claude licenses.

The Almissa cyanamide plant in Yugoslavia built in 1909 to utilize water power, was modernized in 1928. The Ruse plant built in 1916 with the participation of Nobel, Bosnischen and Pragen interests was capitalized originally at 10,000,000 kr. (\$2,000,000), now 20,000,000 dinar (\$4,000,000).

#### Projected Plants

Belgium—Soc. Produits Chimiques du Marly (capital 150,000,000 francs or \$6,000,000) is considering plant at Vilvorde-Brussels with an annual capacity of 100,000 tons ammonium sulfate.

*Egypt*—A commission of the Ministry of Agriculture is investigating the possibility of a plant using the power of Assouan falls.

*Finland*—Two projects have been presented to the Government the first, a plant with 50,000 ton nitrogen capacity, the other a Mont Cenis plant with an output equal only to domestic requirements.

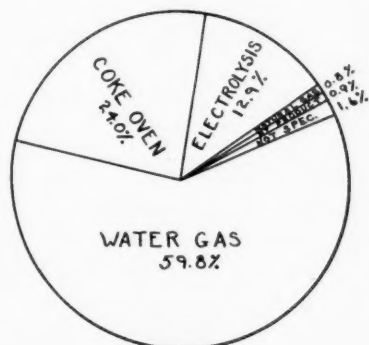
*France*—Finalens, subsidiary of Mines de Lens, plans a plant at Dauvrin with a capacity of about 12,000 tons nitrogen.

*Germany*—Plans for a plant at Grillo with capacity of 30,000 tons to be built by Gelsenkirchner Bergwerk were abandoned on formation of the German Nitrogen Syndicate. A plant at Guido-Grube, sponsored by Preussische Bergwerks and Hutten A.-G., to cost 14,000,000 R. M. (\$3,500,000), has not been started because the necessary capital could not be raised.

*Manchuria*—The South Manchuria R. R. has planned a plant, 14,000 ton annual capacity, at Anzan, Manchuria.

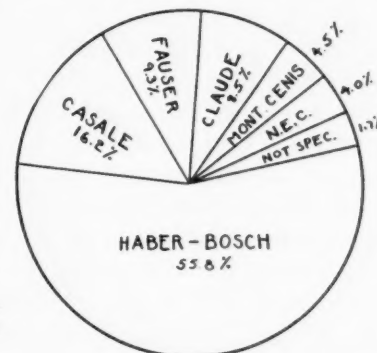
*Mexico*—The Department of Agriculture at Vera Cruz has proposed a company, with taxpayers invited to purchase stock, to erect a nitrogen fixation plant to supply low cost fertilizers to the farmers.

*Union of South Africa*—At a cost of £500,000 (\$2,000,000), a plant is to be erected (I. C. I. participation) at Modderfontein, Transvaal.

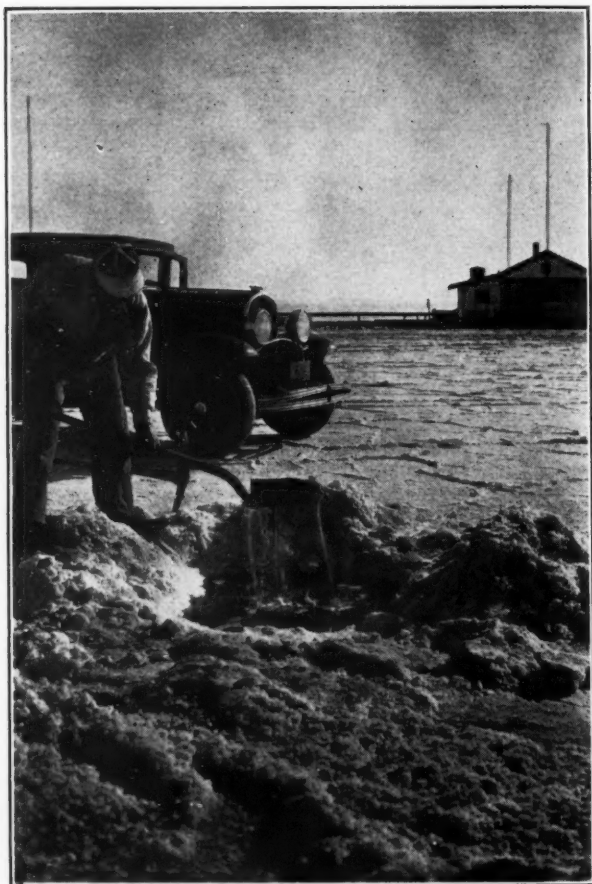


Left, distribution of hydrogen sources

Right, distribution of synthetic ammonia processes



No compilation of this sort could be possible without frequent recourse to the material of the Chemical Division. Bureau of Foreign and Domestic Commerce.



Searles Lake—Chief source of American potash—whose body is a porous mass of salt saturated with brine. This brine pumped to the surface and evaporated yields borax and potash which are later separated. Over a million gallons of this brine is being so treated every day

OVER the past decade borax prices have declined substantially, so that the present price of \$47 per ton, compares with \$155 in 1920. Roughly, ninety-five per cent of world borax production now comes from the Mojave Desert regions of California, and a third of it is associated with potash production.

As a result of the sharp price decline borax has entered many new fields where a mild alkali is required. By far the greatest increase in use has probably taken place in the manufacture of glass, where it formerly entered into only the manufacture of the more expensive heat resisting glasses. The vitreous enamels, the glazed surfaces of china dishes, toilet fixtures, tiles and other pottery ware all contain borax and boric acid. Both materials are essential ingredients of heat resisting glasses such as "Pyrex." Borax and boric acid are also used in the manufacture of glues and pastes, playing cards, shoes, textile fabrics, polishes, soaps and cleaning compounds, and many toilet preparations.

The American Potash and Chemical Corporation treats Searles Lake brine by an evaporation and crystallization process is an extract both borax and potash which are produced in definite relationship to one another. For a number of years the corporation

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# Borax and America's

By G. MacIntosh\*

had rather unsatisfactory results, but in 1926 the present plan and method of manufacture was adopted and since that time production and earnings have advanced considerably. The table below confirms the progress made.

## American Potash & Chemical Corporation Production and Profits

	Production of Borax & Potash Salts (tons)	Net Income
1927.....	103,753	\$ 761,000
1928.....	138,291	1,588,882
1929.....	141,116	1,348,428
1930.....	146,852	1,771,108

## Expanding Production of Potash

The company is currently expanding production facilities by not less than fifty per cent and early in 1932 these facilities should be completed. Whether or not greater borax production will lower prices is a matter which must await future developments. Prior to 1929 American Potash & Chemical Corporation was controlled by Consolidated Goldfields of South Africa, Ltd., a British Company, but control was sold in that year at a price said to have been very satisfactory. Consolidated Goldfields of South Africa, Ltd., however, states that it still is greatly interested in the American company's future and still has the management in its hands. Just who the new outside interests are is one of the current chemical mysteries. Rumor mentions to British Borax Consolidated, and the German Potash Cartel.

About two-thirds of domestic borax production is obtained from a process which treats rasorite ore, also located in the Mojave Desert region, mainly from the mines of Pacific Coast Borax Company, a subsidiary of Borax Consolidated, Ltd., and to a lesser extent from the mines of Western Borax Company.

In the table below are shown various domestic production statistics pertaining to the excellent growth of borax in the past ten years.

# Potash

## Chemical Twins

The ability to supply domestic potash is dependent largely upon our ability to consume larger quantities of borax.

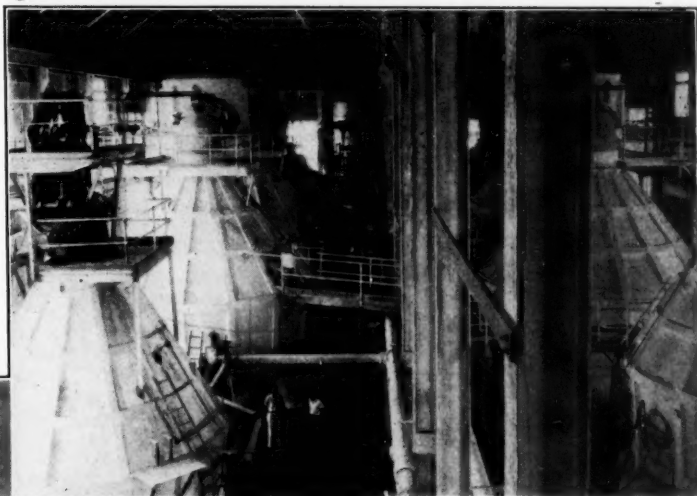
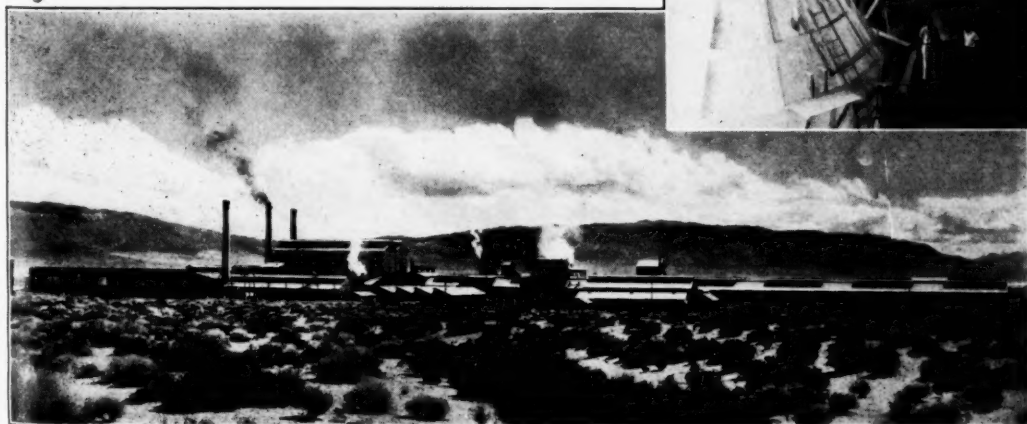
### U. S. Production of Boron Minerals

	Short Tons	Value
1921.....	50,000	\$1,600,000
1922.....	85,220	2,705,140
1923.....	136,650	3,994,790
1924.....	116,110	3,183,910
1925.....	113,700	3,085,660
1926.....	115,970	3,128,110
1927.....	109,080	3,473,399
1928.....	131,000	3,999,773
1929.....	169,870	4,515,375
1930.....	177,360	5,351,999

It is perhaps well to point out that potash is derived only in conjunction with borax in so far as brine treatment is concerned, it not being derived in the production of rasorite, which embraces the major portion of borax production at present.

Exports of borax are of considerable importance. The low value per ton includes borax shipped in the crude form and hence is not a reliable indicator of actual prices, but does show, in a general way, the downward trend of prices.

Two views of the operations of American Potash & Chemical Corp. at Searles Lake, California. Below, is a general view of the plant in the Great American Desert showing from left to right cooling towers, boiler house, evaporator house, crystallizing house and storage warehouse. Right, is a view of the interior of the evaporator house whose multiple effect evaporators handle one million gallons of water daily from the brine



The danger of our dependence on foreign sources for potash in war times was demonstrated fifteen years ago

With German supplies of potash cut off during the war, prices soared to enormous levels, and seaweed

### Borax Exports

	Short Tons	Value	Value Per Ton
1921.....	2,031	\$ 270,000	\$133.00
1922.....	8,825	875,000	99.40
1923.....	20,275	1,607,000	79.10
1924.....	16,871	1,601,000	95.10
1925.....	16,044	1,528,000	90.10
1926.....	14,305	1,257,000	87.70
1927.....	36,954	2,422,000	65.60
1928.....	67,851	3,454,000	52.40
1929.....	79,884	2,935,000	36.70
1930.....	82,931	3,058,000	36.90

on the Pacific Coast, dust from cement mill and blast furnace were made to yield potash in commercial quantities, in addition to the lake brines of California and Nebraska. With the decline of potash prices after the war, this production vanished, excepting that of the American Potash & Chemical Corporation, (about 95% of domestic output) and that from the alcohol distillery of U. S. Industrial Alcohol Company in Maryland, which derives potash as a by-product. After the war the former German potash mines of Alsace reverted to France. In 1926 the Franco-German Pact was concluded, which runs for ten years and controls approximately 95% of world production. Under this allotment, Germany controls approximately 70% of world production. Important by-products of Franco-German potash production are bromine (used in manufacture of ethyl gasoline fluid), rock salt, magnesium chloride, and Epsom Salts. German agriculture is an enormous consumer

of potash and uses approximately 60% of that country's supply. Just as American fertilizer mixtures contain too little potash and too much phosphorus, so the reverse is true of Germany. Holland and the United States are the largest consumers of exported German potash, ranking about equal and together take almost half the German potash exports. In the table below of German potash sales it may be noted that consumption has been consistent in recent years; prices have remained quite steady, stimulation of sales being given in off season periods by varying trade discounts.

#### German Potash Sales

	<i>Metric Tons</i>
1913.....	1,221,406
1921.....	1,118,996
1922.....	1,445,667
1923.....	990,000
1924.....	843,860
1925.....	1,225,420
1926.....	1,099,740
1927.....	1,239,395
1928.....	1,421,216
1929.....	1,401,000
1930.....	1,356,728

Largely as a result of the world-wide agricultural depression, sales of the German Potash Syndicate declined 25% in the first six months of 1931. It is anticipated that German potash producers will derive larger supplementary income from oil production with which to offset the decline of potash profits.

A serious challenge to Franco-German potash supremacy would appear to exist in the contemplated plan of the Soviet. In the table below we show proposed Russian potash production plans, which would obviously increase the world supply enormously, if successful, and would probably bring about a material price reduction.

#### \*Russian Potash Production Plans

	<i>Metric Tons</i>
1932.....	1,000,000
1933.....	1,800,000
1934.....	4,500,000
1935.....	6,000,000

\*Tonnage is in potash, salts, which have perhaps twenty-five per cent potash content, and hence are not directly comparable to other tables which show only potash content.

Any one of a number of things may happen which would deter or eliminate Russian production, not the least of which is transportation difficulties.

In an effort to eliminate our reliance upon foreign interests for potash, Congress appropriated (1926) \$100,000 annually for five years to search for potash in the Permian Salt Basin. From the March and April issues of "CHEMICAL MARKETS" it will be recalled that the Permian Salt Basin stands northwest from Western Texas and Southeastern New Mexico across the Panhandle sections of Texas and Oklahoma into Kansas. The Basin in its entirety covers ap-

\*In terms of potash salts of perhaps thirty per cent potash content.

proximately 70,000 square miles of surface area. If we can produce our potash requirements, a step forward in agricultural developments will have taken place, for we are already self-sustaining in phosphorus and nitrogen.

The United States Potash Co., in which the Pacific Coast Borax Co. has an interest, recently began production of crude potash in the Carlsbad District of New Mexico. It is stated that a refining plant of \*5,000 tons daily capacity will be erected. If this development proves feasible, other large enterprises may go into this field. Moreover, it is not unlikely that rich deposits of potash in this region may be discovered in connection with oil drilling.

Statistics below indicate that production of potash in the United States during 1930 was six times that of 1921.

#### U. S. Potash Production and Sales

	<i>Production</i> <i>Short Tons</i>	<i>Sales</i> <i>Short Tons</i>	<i>Total</i> <i>Value of Sales</i>	<i>*Value per</i> <i>Ton</i>
1918.....	54,803	38,580	\$15,839,618	\$411.00
1921.....	10,171	4,408	447,859	98.50
1922.....	11,714	11,313	463,512	41.00
1923.....	20,215	19,281	784,671	40.60
1924.....	22,896	21,880	842,618	38.50
1925.....	25,448	25,802	1,204,024	46.60
1926.....	23,366	25,060	1,083,064	43.20
1927.....	43,150	49,500	2,448,146	49.50
1928.....	59,910	60,370	3,029,422	50.40
1929.....	61,590	57,540	2,988,450	52.00
1930.....	61,270	56,610	2,986,157	52.80

\*F. O. B. Plant.

In the table below domestic potash imports are shown, the main portion of which are for agricultural purposes, but a substantial amount of which is consumed in connection with chemical uses.

#### Domestic Potash Imports

	<i>Short Tons</i>	<i>Total Value</i>
1921.....	78,698	.....
1922.....	201,415	.....
1923.....	209,950	15,405,000
1924.....	200,365	13,378,000
1925.....	258,200	17,320,000
1926.....	238,000	18,898,000
1927.....	224,973	18,370,000
1928.....	297,000	22,520,000
1929.....	325,000	23,729,000
1930.....	342,071	24,478,000

It is too soon to state whether domestic potash can be produced in commercial qualities from natural deposits, but at least the future possesses interesting possibilities. Future developments will depend largely upon agricultural conditions; the possibility of the Soviet becoming a large potash producer; and ability of the industry to lower production costs. Whether or not the recent dividend omission by American Potash & Chemical Corp. is in anticipation of difficulties ahead, or a desire to conserve cash resources for the current expansion program is a matter for conjecture. Certainly, future borax and potash developments will bear watching and may have an important effect upon the ever changing chemical industry.

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# Plant Management

*A Department*

*Devoted to the Business Problems of Chemical-Process Production*

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## Production Programs

**M**OST American chemical production schedules have been rather drastically cut and much of our industrial research has been redirected towards searches to discover new utilities for our chemical products.

**T**HESE are practical measures, befitting the times; but is interesting to note an increasing criticism of mass production methods, a growing belief that our whole scheme of production is fundamentally askew, a conviction that until the means of consumption can be perfected and extended, our production programs must of necessity be curtailed. Paul Mazur, erstwhile prophet of "American Prosperity," is busily preaching the newer doctrine that consumer demand is the omnipotent ruler of our economic destiny.

**W**E REFUSE to give up the advantages of an increasingly efficient manufacturing technique quite so tamely. More goods in shorter hours means too much. We admit the challenge to mass production that the jam of overproduction creates. We have even pointed out on this very page the advantages of the smaller, more flexible chemical units as revealed tellingly during the past eighteen months. But we refuse to go back to Gandhi's spinning wheel simply because

Ford is not able to sell all the cars that he is able to make. We cannot see the immediate future as an opportunity for our chemical technologists to squat back on their haunches waiting for the sales manager and his crew to kick them again into activity. Two good reasons counsel against any such policy of passive resistance to the challenge.

**I**N THE first place one of the very surest ways of stimulating and strengthening consumer demand is by lowering the price, and while it is a commonly observed economic phenomenon that cut prices do not increase the sale of chemicals directly, nevertheless it is an equally true fact that lower prices extend markets and by lowering the cost of consumer goods fabricated of chemicals they do ultimately increase consumption. Secondly, it is plain that the logical next step of our verticle chemical combinations will be in many instances to extend our distribution and sell many of our chemical products to the ultimate consumer. Many executives fearfully dodge this issue with its complicated merchandising problems; but it is an obligatory development, and it opens wide the opportunity for new products and new processes, for an entirely new technique of production, for planning even more elaborate production programs for the future.



**"THE PLANT  
HASN'T PUT US  
IN THE RED  
IT'S THE TIMES"**

## POPULAR FALLACIES OF INDUSTRY

**W**ITH a serious deficit staring them in the face executives look frantically for the underlying cause. And—hoodwinked by a popular fallacy—many blame "the times."

★ ★ ★

Asked what they've done to meet the situation they reply, "We've cut corners... made savings with such and such equipment, simplified certain processes, and reduced our overhead in all these departments."

When such measures fail to turn red figures into black, manufacturers might as well face the facts: *Perhaps their plant is at fault.*

Multi-story buildings, long obsolete, or floor space blocked by columns that cause backtracking and prohibit straight-line production—or scattered, inefficient one-story units—all breed "White Elephants."

Plants geographically off-center—paying the penalty of heavy freight charges—are often more to blame for dwindling profits than "the times."

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in new strategic centers to help firms "get out of the red"—at *bargain costs*... with *15 to 25% savings*.

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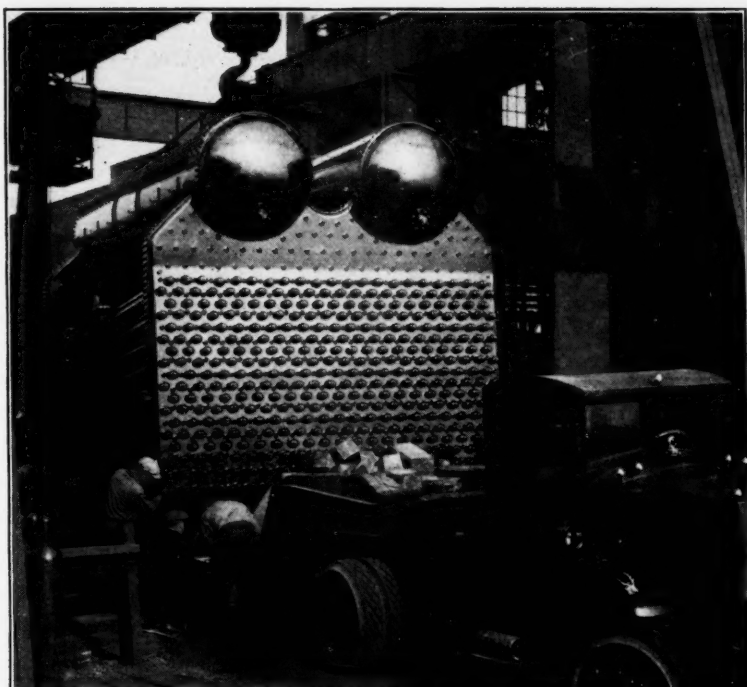
ELEKTRO-DESIGN

Individual.....

Firm.....

City.....

CM-12-31



*A Heine Longitudinal Drum 604 Horsepower Boiler loaded on tractor for shipment to the Mallinckrodt Chemical Works. This boiler, furnished by Combustion Engineering, is the largest boiler of its type ever shipped from the plant completely assembled*

# POWER for the Chemical Industry

By Waldo Hutchinson

**S**TEAM and power requirements of the chemical industry must be treated broadly as the chemical field covers so many different kinds of industries, that generalities will find many exceptions.

Most chemical reactions or physical changes in chemical industry involve either the addition or withdrawal of heat, so that most plants must have devices for adding and taking away heat. Heat ordinarily is supplied through the medium of either steam or electricity and is usually removed through the medium of cold water or refrigerating machinery.

In the ideal chemical plant, the materials would be unloaded, when received in car loads, by electrical machinery, conveyed by electrical conveyors and usually ground or pulverized by electrical driven

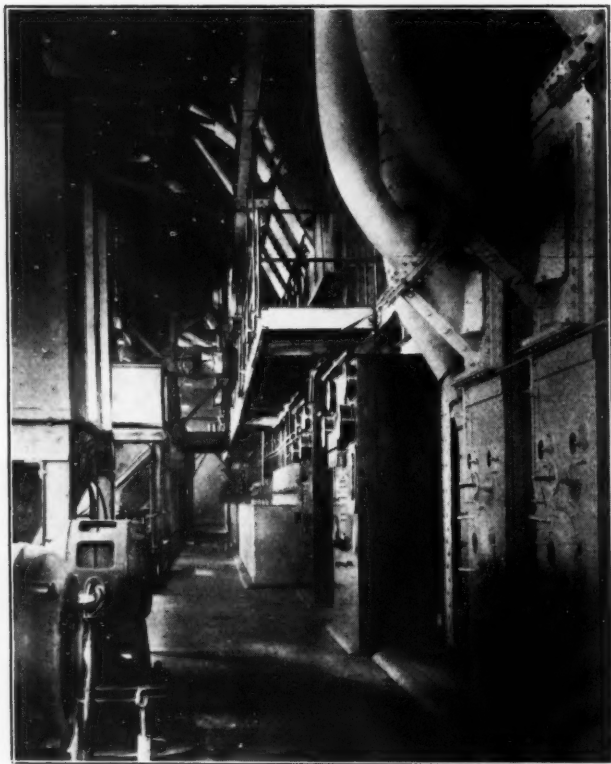
grinders. Evaporations and concentrations would occur with steam as a heating medium, obtained as a by-product of the steam turbine in the power house, and both steam and electricity would be used in further processing or refining. Gravity, where possible, and conveyors otherwise should move the materials to their final destination on the shipping room floor.

There are few chemical plants which do not need a power plant as a necessary adjunct. This does not necessarily mean that the chemical industry should generate all or even any of the electric power it uses. In most cases, however, when the heat balance of the industry is studied it is found that the requirements for steam and electricity are so related that one can usually be secured at low cost as a by-product of the other.

## SOME OF THE MANY WAYS STEAM AND ELECTRIC POWER ARE USED IN THE CHEMICAL INDUSTRY

	Live Steam 100 to 300 lb. per sq. in.	Exhaust Steam 1 to 60 lb. per sq. in.	Electricity
As heating agent	Distillation Evaporation Concentration Rectifying Drying Sterilizing Washing Heating	Distillation Evaporation Concentration Rectifying Drying Sterilizing Washing Heating	Distillation Evaporation Concentration Rectifying Drying Sterilizing Heating
In steam cylinders or turbines as mechanical power	Refrigerating machines Compressing air Pumping water Generating electricity	Refrigerating machines. Generating electricity	
Power for driving			Refrigerating machines Compressing air Pumping water Conveying equipment Miscellaneous motors Solenoids Magnets Illumination Electric furnaces

One large plant located near Chicago generates steam at 200 lb. pressure with about 100 deg. F. superheat. This steam is first used on process work, where



Looking down the firing aisle from Boiler No. 6 in the Dow Chemical power plant at Midland. At the left are the coal hoppers of the unit pulverizers, fed by the larry. Installations made by the Fuller Lehigh Co.

it gives up the superheat, and becomes saturated at 150 lb. From here it is used on a turbine for driving an electric generator, the turbine being bled at the 5-lb. stage for steam for dry houses and for heating buildings. In the plant referred to, the steam performs three functions and all the heat units are made to work. Unfortunately, during the summer months the third stage of the cycle is not operative except as to the dry houses, since the buildings do not require heating in the summer months.

In another large chemical plant, manufacturing a similar line, the cycle is transposed; the steam is used first for power generation, second for high temperature processing and finally for low temperature heating.

To the uninitiated, this cycle sounds perfect; in reality, it has many factors to be balanced. If the demand of the steam turbine, the process equipment and the low-pressure heating were equal, at all times of the day and night, winter and summer, the dream of the thermodynamist would be realized. Unfortunately, that never comes true.

Probably more than any other industry, the chemical industry gives to the engineer the possibility of making a heat cycle and balances which will be economical. This is true because the industry uses large quantities of both heat and electrical power,

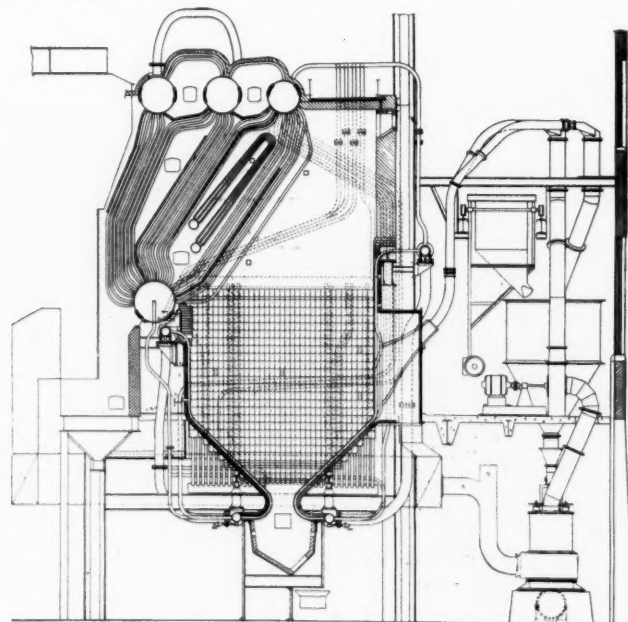
while certain other industries use a great deal of one and little of the other.

In studying his heat balance, the chemical engineer can often replace a steam-heated process with an electrically heated process or vice versa, to make a better balance. The general rule for electrical power in the chemical industry is to make power in so far as the exhaust or by-product heat can be utilized and to purchase the balance of power needed unless it can be made cheaper than it can be purchased. Each plant, of course, needs an individual analysis.

While an economical heat balance should always be sought, it must not be obtained at a sacrifice of dependability. The first requirement of any industry in the chemical group is, that the supply of steam and electricity be unfailing. The cost of many chemicals is so great that their destruction or total loss, due to an interruption in process, would involve more money in a few hours than the economical heat balance would save in a year.

In the chemical group are usually included the paint, oil, dye, drug, explosive and heavy chemical industries. The uses to which they put steam and electricity are shown in a general way in the accompanying table.

In the chemical industry, where the equipment is large and the lots worked are in hundreds of gallons or thousands of pounds, distillation processes are generally carried on with steam as the heating agent. There are some exceptions to this rule where heated oil, mercury, direct fired stills or electrically heated stills are used. These cases ordinarily fall into the high temperature class, higher than can be supplied with steam.



Cross section of one of the Fuller Lehigh units at the Dow plant

Direct fired stills often can be operated as cheap or cheaper than steam heated stills; but the advantage of temperature control, fire hazard, convenience of operation and safety are all with the steam heated

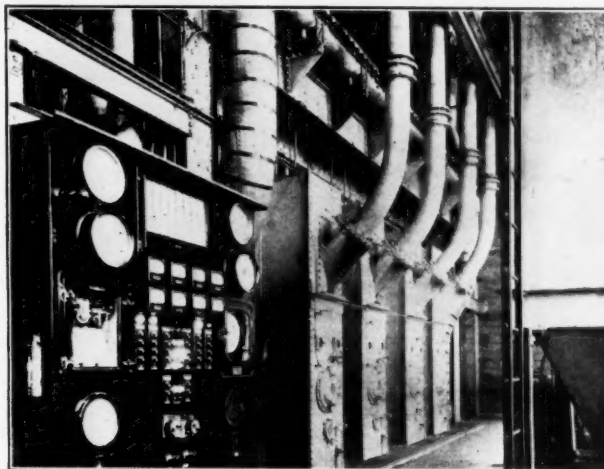
still. Many stills are operated under a vacuum and in such cases exhaust steam on most products will furnish a cheap and satisfactory heating medium. In a plant with which I am familiar, steam is generated at 130 lb. and is used at this pressure on all stills, requiring jacket temperatures of 300° F. or over. On processes requiring temperatures of 212° F. or over, but less than 300° F., steam is used at 15 lb. pressure, having first been expanded from 130 to 15 lb. in driving large air compressors.

In processing requiring less than 212° F., steam at 1 lb. pressure, exhausted from Corliss engines driving electric generators, is used. A live steam line, of course, must always make up the deficiency when the process line pressure is not maintained by the exhaust from the engines or air compressors. The reducing valves, which automatically supply the live steam, are so arranged that the 1-lb. exhaust line draws on the 15-lb. line for a deficiency, and the 15-lb. line in turn draws on the 130-lb. line. In this way, no live steam is used if there is a surplus of exhaust, at the pressure desired or at any higher pressure.

What has been said generally of the uses of the still and the mediums of supplying heat will be true largely of processes involving evaporating concentrating and rectifying. Certain chemicals are so inflammable that no direct fired apparatus can be considered in any process where they are involved. Other chemicals are so sensitive to heat that only the most rigid care to avoid overheating will prevent their destruction. The apparatus, in each instance, must be selected to meet the particular requirements.

Where the apparatus is small and the process must operate for long periods without an attendant, electrically heated apparatus has a definite place and a decided preference. Could the ordinary plant produce heat in the form of electric energy as cheap as they can produce it in the form of steam, there would

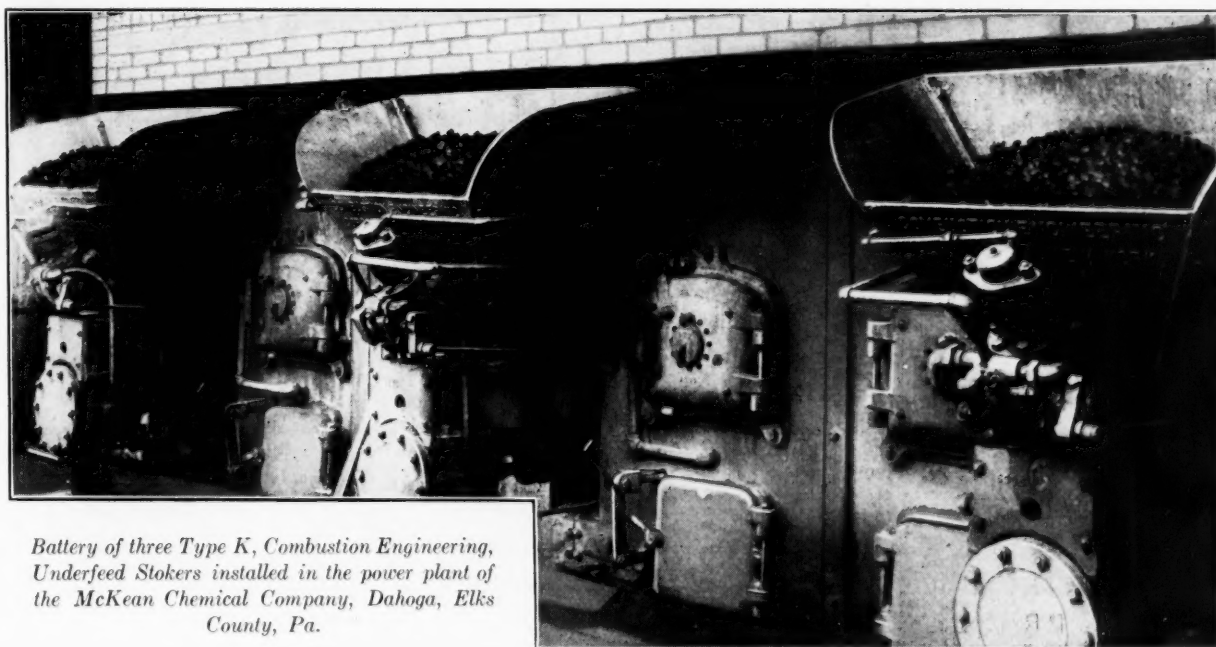
be a tremendous change in our chemical industries and electrically heated equipment would largely replace steam heated equipment.



*Front of Boiler No. 6, (Dow) showing Calumet burners and control board. The Dow power plant is considered one of the outstanding power achievements in the last few years*

Drying in the chemical industry takes a great many forms, from ordinary atmospheric evaporation, where neither the time element nor the final water content is essential, to drying under the most precise conditions. Much drying is done under controlled conditions, where air is used as the drying medium and where the air is carefully conditioned as to temperature and humidity. Hit and miss drying with hit and miss results is decidedly unprofitable. In virtually all large dryers, producing conditioned air, steam is used as the heating medium because of the lower cost to produce heat in the form of steam.

In some instances, however, large electrically heated dryers are being used economically. For work involving lots of 100 lb. or less, the electrical dryer has a decided preference.



*Battery of three Type K, Combustion Engineering, Underfeed Stokers installed in the power plant of the McKean Chemical Company, Dahoga, Elks County, Pa.*



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Where mechanical separation or drying occurs by the centrifugal method both steam and electricity are used. The centrifuge may be driven by a steam turbine or by an electric motor. Each has its place, and each has advantages but the electric motor drive seems to be gaining in usage over the steam turbine. The moving parts of dryers, such as fans, pumps, conveyors and elevators are virtually all driven by electric motors. In large drying operations, such as removing moisture from coal, waste heat from power house chimneys is often used in preference to steam because it can be obtained cheaper. Electricity, under such circumstances, would obviously be prohibitive in cost.

Sterilizing ordinarily means raising the temperature to 240° F. or over to kill bacteria. Both steam and electricity are used as heating mediums for this purpose. When dry sterilization is necessary, steam in closed coils or electrical heaters is used; but in wet sterilization, steam alone is the heating agent. Gas, of course, is another source of heat often used for sterilizing. Generally, however, except in small laboratory experimental apparatus, steam is used on large sterilizers and electricity on small ones, the latter being simpler but too costly to operate where large amounts of heat are required.

Washing and cleaning in the chemical industry is a serious problem. Where apparatus is used for different products carelessness in washing or cleaning has cost many thousands of dollars. Contaminations, mixing of colors, acid and alkaline reactions have all taught the experienced that good hot steam, as a cleaning agent, has few equals and often is much preferable to powerful chemical solvents. For this reason steam is indispensable in most chemical plants for washing and cleaning and a considerable portion is used for that purpose.

### Heating Chemical Buildings

Heaters in the chemical industry cover indeed a large field of apparatus. Buildings usually are heated by steam and in recent years the unit heater in the form of an electric fan back of an efficient steam radiator has found much usage in the chemical as well as other industries. This, of course, is but a single adaptation of the blower system minus the air ducts. It is cheap to install, operate and maintain, takes little space and is decidedly efficient. It combines the cheapness of steam and the utility of electricity into a good heat dispensing machine for buildings.

Because of the large amount of piping and plumbing involved in most chemical plants, heating systems are required even where but few people are working. In some instances, however, where much heat is liberated by processes, the heating system finds its greatest use on Sundays and holidays. Small amounts of direct radiation still heat some chemical plants and are generally used where the least amount of air disturbance is desirable.

Heating in processes covers a tremendous field and one in which both steam and electricity play important parts. Many chemical changes require high temperatures where direct combustion of gas, oil, coke or coal furnishes the most economical method. Processes requiring heat above 800° F. practically always obtain such heat by the preceding method or by electricity. Seldom, if ever, is there such a process where electrical heat is not the most desirable. The higher cost, however, often prevents its use. With reduced costs of making electricity, the tendency for the electrical method will become more general. The applications for small electric heaters are so numerous that much could be written on this subject alone.

### The Place of Electric Heaters

On a finishing belt, I have seen in a space of 10 ft., electrical heaters melting materials to be packaged, other electrical heaters keeping materials from congealing and still others heating glue pots and heating sealing machines. The small electrical heater was one of greatest contributions the electrical industry ever gave the chemical industry. Probably the first two requirements of the chemical industry were heat and water. Before the days of electricity, they had steam power and before the days of steam power, there was animal and human power; but there was also very little chemical industry. Today, electricity is as indispensable as heat or water and its uses are constantly growing.

Refrigerating machinery is also necessary and important. The machines range in size from the small household unit to single units involving hundreds of tons. In every case, heat or mechanical power is involved. Both absorption and compression cycles are used. The small units are ordinarily of the compression type, using an electric motor for power, and in recent years small automatic absorption refrigerating machines, using the heat from a gas flame or the heat from an electric coil as the form of energy, have also been introduced. The processes involving large amounts of refrigeration use either the steam-driven or motor-driven compression machines or the absorption machine operating on low-pressure or exhaust steam.

Probably the industry as a whole uses more refrigerating capacity in the form of compression units. Much power either in the form of steam or electricity is used for this purpose and many ingenious combinations have been worked out to obtain economy. One large chemical plant, using Corliss engines for driving electric generators, uses the exhaust from these engines to operate large absorption refrigerating machines. These refrigerating machines are used for air conditioning where dehumidifying is involved and this dehumidifying is limited to the warmer months of the year.

In the colder months of the year, the exhaust from the engines is used for heating buildings. This is a

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decidedly economical plan, especially since the plant referred to is so located that water to run these engines condensing cannot be obtained. Another plant uses live steam for engine-driven ammonia compressors and takes the exhaust steam from these engines to operate at 2 lb. pressure other refrigerating machines of the absorption type.

Compressed air is another of the necessities of the chemical industry. It seems to be used in abundance everywhere. In displacing liquids, lifting water from wells, cleaning, transferring materials, operating hoists, agitating and in many other ways, it plays an important part in the chemical industry. The air compressors are driven by steam or by electric motors. There are some exceptions but they are few in the chemical industry, where oil engines are driving electric generators, refrigerating machines or air compressors.

### Economy of Small Unit Compressors

Air compressors, of course, are large and small for pressures of 15 to 150 lb. The writer has seen many instances where it was cheaper to install a small motor-driven air compressor in a remote building than to pipe air from the central power house. In some instances air is compressed at two different pressures, the lower pressure being used where it will suffice, and the higher pressure being used only where needed. This lower pressure is usually from 10 to 40 lb., and the higher pressure from 75 to 150 lb. per sq. in.

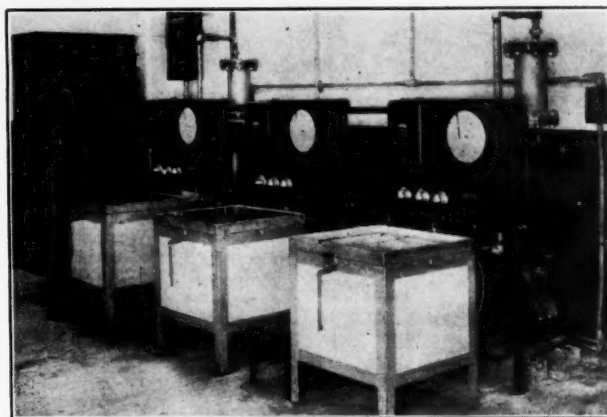
Few are the chemical plants which do not generate at least some of the electric power they consume. The generators are usually driven by turbines or where the industry is small Corless or unaflo engines. Like all other industries, 110-v. d.c. was first used for both power and light. In the last 30 years direct current, both 110 and 220-v. has been replaced by alternating current; 60-cycle, 3-phase, 440-v. seems to be used more largely now than any other.

In certain large applications, involving electric furnaces, high voltage current and 25-cycle are used and in a few other instances, 2300-v., 3-phase, 60-cycle has been employed. Some plants still feel that 220-v. direct current is preferable for general use but the newer and more progressive have generally adopted alternating current. The reasons for this, of course, are not peculiar to the chemical industry but apply generally to most industries. The transmission of direct current is costly. Direct current motors are more expensive in original cost and in maintainance. Of course, the matter of power factor is not present with direct current. Neither is the question of heavy duty starting, while the matter of speed regulation is in favor of direct current.

The above have all been ably met by the manufacturers of alternating equipment with synchronous motors, squirrel cage motors, heavy starting duty motors and slip ring motors. Of course, the final

answer to direct current is that if you want it you must make it or at least transform it yourself. It is not for sale to large industries.

About 5 years ago the writer changed over a plant from 110v. d.c. to 440-v., 3-phase, 60-cycle for all motors  $\frac{3}{4}$  hp. or larger and 110 v., single-phase, 60-cycle for motors under  $\frac{3}{4}$  hp. This new plant had



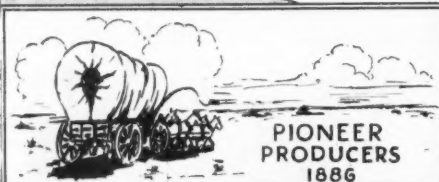
*Electrically heated mixers, autoclaves, and drying closets have been furnished for the chemical and pharmaceutical fields. Battery of autoclaves installed by F. J. Stokes Machine Co.*

1,000 motors ranging from 125 hp. down to fractional hp. motors. Much pressure was brought to keep the job on direct current and the advantages of direct current were loudly proclaimed. The job was put through on alternating current, however, and every motor application was studied for type and size of motors and method of drive. The installation has been satisfactory, dependable, safe and economical, and has fully justified the decision in favor of alternating current.

### Mechanical Plant Improvements

The chemical industry has gone forward by leaps and bounds and was much stimulated by the World War. Science and research have in recent years discovered many new products, improved old products and brought to light great unknown truths so that the chemical industry has made more progress in the last 25 years than in the previous 100 years.

Except in crude materials, the modern chemical plant has little resemblance to its forefather. Where formerly were dust, foul smells and dirty operators doing slavish work lifting and wheeling heavy loads, today we have the clean, well lighted and ventilated, conveyORIZED, mechanically operated institution. Power created for the use of man has been put to work. These things could not have been done if methods in the industry had not kept pace with the growth. In fact, methods by reducing costs have regularly preceded growth. These methods have usually consisted of engineering skill plus steam power and electricity and an abiding faith in the future of American industry.



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# Correct Welding of Nickel and Its Alloys Employed In Chemical Equipment\*

By F. G. Flocke†

**T**HE three alloys considered are Monel metal, pure nickel, and Inco chrome nickel. The first two are the most commonly known and widely used of the high nickel alloys, while the last is a recently developed metal having a superior resistance to tarnish or stain and somewhat higher physical properties than pure nickel.

Each of the three alloys has a definite place in the chemical industry and each is used in a wide variety of conditions.

Monel metal is resistant to both acid and alkaline corrosion, as for instance in salt dryers, dye tanks, stills, retorts and condensers, extractor baskets in ammonium sulfate manufacture, drying trays in manufacture of dyestuffs and pharmaceuticals, rubber latex spraying equipment and innumerable pieces of chemical engineering equipment. Also, laundry machinery and dry cleaning equipment, meat packing viscera and abattoir equipment such as oleo melting kettles.

Nickel, while slightly less resistant to acids is very resistant to alkalis and to a wide range of salts. The most important application of nickel lies in caustic and food product evaporators in which the tube sheets, tubes and downtakes are of pure nickel with the body of nickel clad steel. One such caustic job recently employed upwards of 200,000 lb. of rolled nickel while the average job employs in the neighborhood of 20-30,000 lb. Pure nickel also finds application in the ammonia oxidation process in the manufacture of viscose and cellophane and in manufacture of safety X-ray film and photo emulsions. Steam jacketed kettles of nickel are a standard item for the food industry as are pure nickel brine and syrup tanks.

## Uses of Inco Chrome Nickel

Inco chrome nickel is particularly useful in handling foods and milk products because of its high surface resistance which parallels that of the stainless steels rather than nickel or Monel metal. General statements as to its applications would, on account of its newness, be mere estimates, but it is expected that it will fill certain specific requirements in the chemical industry.

\*Abstracts of paper presented before 32nd Meeting, International Acetylene Association.

†Development and Research Dept., International Nickel Co.

For the making of all this equipment there is available such mill products as sheet, plate, strip, seamless pipe and tubing, rods, wire, flats and angles.

The oxy-acetylene welding of nickel and Monel metal has been practiced for more than a decade quite satisfactorily. It has been and is being used successfully in the fabrication of all types of equipment in the chemical field as well as in many applications far afield of the chemical industry. Improvements in recent years, both in fluxes and welding rod, have aided in the advancement in the welding of high nickel alloys.

## Welding Essential Operation

Welding is of fundamental importance in the building of corrosion resistant equipment. Welding in general has made valuable strides during the last three or four years, during which time there has been a parallel betterment in welding practice on nickel alloys. Very little so far as high nickel alloys go has been written or published covering these more recent practices. It is the purpose of this paper, therefore, to cover the practical side of the oxy-acetylene welding of Monel metal, pure nickel, and Inco chrome nickel, consolidating the old practices and newer developments.

There are three essentials necessary to the satisfactory completion of a job:

1. Correct materials and with that we include correct welding rod, flux and material being welded;
2. Proper setting up of job which includes jiggling so as to hold work in place during welding.
3. Proper procedure.

In the main, the oxy-acetylene welding of the three high nickel alloys is much the same, with only minor variations. These are all strong alloys, rather stronger than common steels as indicated together with other physical and mechanical properties in table on following page.

There is a peculiarity manifested in high nickel alloys that is perhaps not nearly so marked in other metals though present—a hot short range—a range of low tensile strength and brittleness, between the temperatures of 1450-1650° Fhar. Both above and below this hot short range they regain their normal strength and ductility. For this reason expansion

and contraction must be taken into account, to see that there are no undue stresses set up or existent while the weld metal and immediately adjacent metal are passing through that hot short range as the weld is cooling. This is accomplished in part by allowing the weld metal to draw and contract in a natural manner instead of holding it so rigidly as to prevent contraction.

It is in part because of the condition mentioned above, as well as the fact that it facilitates welding to

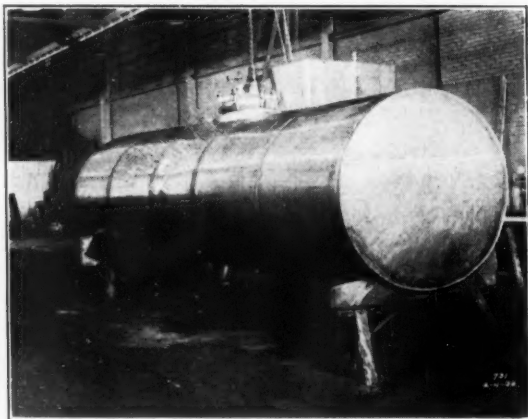


Figure 1

Perhaps the most common weld is the butt seam, used for medium and heavy gauge metal. The setting up is important, more particularly in the lighter gauges

A concrete example is a 3,000 gallon tank of 0.109 nickel built as a truck tank. The tank proper is shown above (Fig. 1). Note the longitudinal seams in Fig. 2. Two seams were made by welding across the 40 in. width of the sheet, welding from both sides. It is not elaborate, being merely a skeleton made of steel angles to hold the edges in line. One 40 in. seam having been welded, the length was rolled into a cylinder, and then the second 40 in. weld was completed to make a continuous cylinder. Each of the 5 sections were made in this way

a marked degree, that proper jiggling is found essential not only in non-ferrous alloys of high melting point, but for the ferrous group too. It is the partial or complete overlooking of this question of jiggling that is at the root of quite a number of welding difficulties. This holds particularly for sheet work rather than for heavy

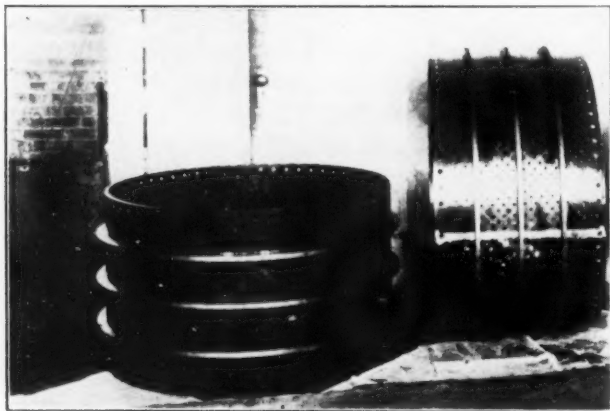


Figure 2

plate, because the tendency of the former to warp is far more pronounced.

It is better practice to take enough time to prepare the work properly. The appropriate jig is simple, consisting of a piece of 3/16 in. steel plate, 8 in. to 10 in. wide and as long as the seam with a shallow lengthwise central groove, two angles, one for each top side of the seam and four C-clamps.

Figures three and four show two of the jigs used in making various types of seams, illustrating in principle what is generally used. All are simply made. C-clamps are used for holding the jig together when in use, so as to get metal-to-metal contact between jig and sheet. By doing this, the jig acts as a chill also absorbing heat that would otherwise work into the sheet and warp it. Occasionally copper bars have been used to have a maximum heat absorption, and where a minimum of buckling is desired. A groove is shown in the lower section, the purpose of this being to permit more rapid welding, as well as to allow the bottom edges to be thoroughly fused. On the corner weld, the sharp corner of the inside jig angle is filed away slightly for the same reason.

In all the cases above, the flux is generally applied by painting the thin paste on both sides of the seam, top and bottom.

#### Comparative Physical Properties

Tensile Properties					
Sheet Metal Annealed					
	Tensile Strength	Yield Point	Elong.	Reduction in Area	Rockwell B Hardness
Monel Metal.....	65-75,000	25-35,000	35-50	65-75	68
Nickel.....	65-75,000	20-30,000	43-43	65-75	65
Inco Chrome Nickel.	90,000	40,000	40		77
Cold Drawn Rod—Normalized					
Monel Metal.....	90-110,000	60-80,000	20-30	35-50	90-100
Nickel.....	80-95,000	70-80,000	25-35	40-60	90-100
Inco Chrome Nickel.	115,000	95,000	25	65	95
Cold Rolled Sheet—Full Hard					
Monel Metal.....	100-120,000	90-110,000	2-8		Shore 95-100
Nickel.....	95-110,000	90-100,000	2-8		35-40
Inco Chrome Nickel.	150,000	125,000	1.5		48
Physical Constants					
	Density	Heat Expansion	Heat Conductivity	Modulus of Elasticity	
Monel Metal.....	8.80	0.000014	6.6	26,000,000	
Nickel.....	8.85	0.000013	15.5	30,000,000	
Inco Chrome Nickel.	8.52	0.000013	3.25	31,000,000	

#### Type of Oxy-Acetylene Flame Used

The oxy-acetylene flame used should be very slightly reducing, that is, a little excess acetylene, with only a slight feather, no longer than an eighth of an inch showing beyond the tip of the luminous cone. In an oxidizing flame copper oxide ( $\text{Cu}_2\text{O}$ ) forms, in the case of Monel metal, and dissolves in the molten metal rendering the alloy brittle and less resistant to corrosion. In the case of nickel and chrome nickel we get a definitely oxidized metal if a reducing flame is not used. We would prefer to recommend a neutral flame, but it is seldom that a set of gauges handled by the average welder will give an absolutely true neutral flame after a short period of use. There is usually some waver, either toward the oxidizing or to reducing side, therefore as a matter of safety a slightly reducing flame is recommended.

It is well, during actual welding, always to keep the end of the welding rod well within the flame, so as to

prevent the oxidation that would result if the hot rod were brought outside of the protecting flame envelope into the open air. Besides being reducing, the flame should be soft, rather than harsh, as is the case when too small a tip is used.

A flux is always used for Monel metal and Inco chrome nickel, and occasionally with pure nickel. Inco Gas Welding and Brazing Flux is used with Monel metal and nickel, while a special flux is available for chrome nickel. These fluxes were developed for the three high nickel alloys under discussion, and are not to be considered as applicable for other metals.

In using flux, we have a twofold purpose in mind, namely, (1) to protect the metal from oxidation and to dissolve oxide, (2) to improve the fluidity of the molten metal. Flux may be used either as a dry powder into which the heated end of the rod is dipped, or as a thin paste. The paste is made by mixing the dry powder with alcohol or dissolving it slowly in boiling water. To secure proper solution, the water must be boiling and not simply hot.

When used dry, the flux will flow around each drop of metal and penetrating to the underside of the weld, thus protecting the weld metal from oxidation and actually keeping the metal bright. With reasonably careful handling, this practice fuses the metal completely through the sheet producing a shallow reinforcing bead on the under surface of the seam. When used in paste form the flux is painted on the seam with a small brush or acid swab, and occasionally on the welding rod.

Ordinary borax is widely used as a flux and due to its valuable properties has often been advocated as a welding flux for high nickel alloys. As a matter of fact it is one of the ingredients of the Inco flux but is present in relatively minor proportions, and we do not consider it a suitable flux in itself. Borax improves fluidity of the molten metal, but when present in large proportions the extra fluidity is accompanied by lack of ductility in the finished weld. It does not dissolve the metallic oxides sufficiently to produce the clean appearance sometimes necessary and it is rather difficult to remove. The recommended flux is free from these defects.

In introducing a steel welder to the welding of nickel alloys it is often found that he puddles (boils) the metal excessively. For the best results on high nickel alloys there should be little puddling; the molten pool should be kept quiet with the tip of the luminous flame just touching its surface. Puddling burns out the deoxidizers which are important ingredients of these alloys although present in very small amounts. These deoxidizers are sufficient to insure good physical properties and are present in sufficient excess in the welding rods. However, if the welder puddles and boils the metal excessively he will "take the life out of it" by removing the deoxidizers and obtain a brittle and gassy weld.

Extra caution should be exercised in this respect with nickel alloys, because nickel absorbs gases quite

readily while molten and precipitates them as gas pockets on solidifying.

The proper size of tip is best determined by the welder's judgment. If the welding progresses too slowly, it is logical that he should increase his heat,

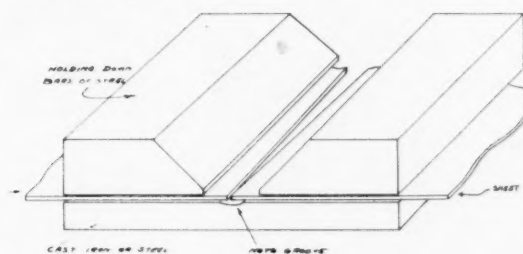


Figure 3

either by a larger flame with the tip already in the torch, or by putting in the next size larger tip. And conversely, if he is hurried, and as a result burns holes

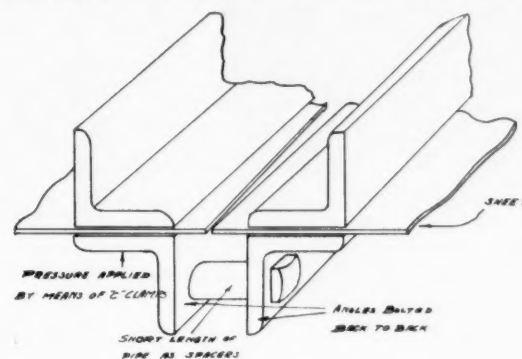
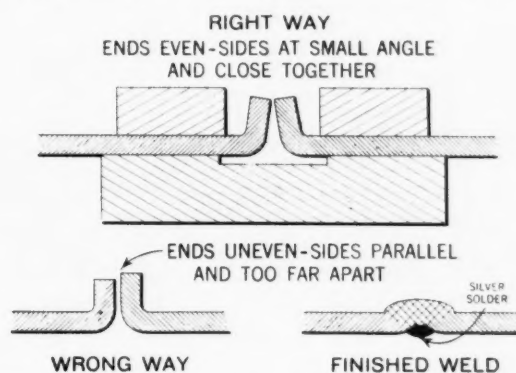


Figure 4

in the metal, and the weld metal is boiling instead of being quiet, obviously the heat should be reduced. It is difficult to say with any degree of certainty just what tip size to recommend for a particular gauge metal, because of the various factors entering, though as basic practice the same size or one size larger than that recommended by the torch manufacturers for similar gauge steel may be used.

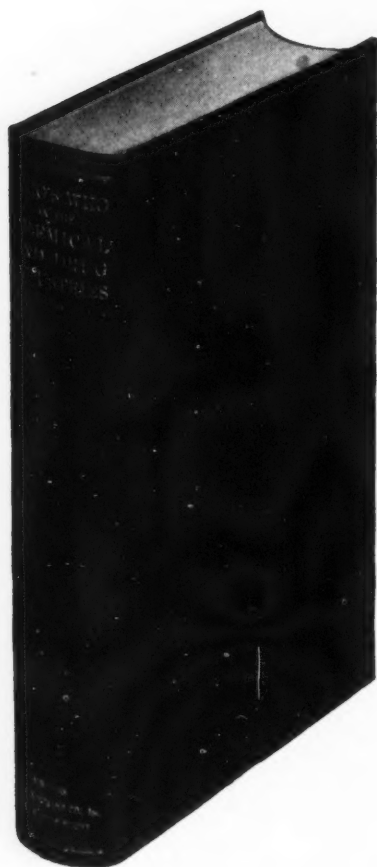
Welding rods are in general of the same composition as the alloy being welded. This is necessary as comparable corrosion resistance with lack of galvanic effects is almost universally desired. Some leeway is



Illustrating the right and wrong way of preparing ends for welding

possible with the deoxidizing additions and the manufacturers of nickel undertake to furnish proper weld-

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ing rods where these are specified. Wire should be bright annealed, soft and free from oxide. Not every wire, even though of normal composition for the alloy in question, will give satisfactory results. Rod to be used for welding should always be so specified.

The welding of thin gauge metal is not difficult. This is accomplished by flanging the edges slightly less than ninety degrees, the turned up edges being as short and as nearly the same height as possible. Before assembling, the bottom and top of the seam is painted with the paste flux mentioned above. No welding rod is needed, the edges merely being melted down with the acetylene flame. The crevice left on the underside is filled in, either with soft solder, silver solder, yellow brazer, or white brazer, depending, on the corrosion problem involved. A seam of this type would be used in making long seams on thin gauge sheets and in making of sphere floats by welding two half sections together. One torch manufacturer has a line of torches whose vital parts are made of Monel metal because of its inherent toughness and strength. The handle formed from strip rolled into a cylinder is welded by using the edge weld described above, of course, fluxing before welding.

Coils are a necessity in many of the process industries, carrying the chemical on the one side, and either a heating or cooling medium on the opposite side. Seamless tubing and pipe is available in all three high nickel alloys for just such coil or manifold work. In the fabrication of these, there are several types of joints usually used. With pipe or heavy walled tubing, gas welding is practical, the ends being beveled to a total of 90° then tacked on opposite sides with an even spacing of about 1/16 in. to 3/32 in. at the base of the vee depending on the diameter and wall thickness. A straight butt joint is used, no jiggling being necessary.

For the higher walled tubing, the joint is made with silver solder, either as a sleeved joint, or a bell and spigot joint. The most important requisite is that the fit be good, that is, not tight on one end and loose on the other, but fit over the entire length. The higher grades of silver solder are remarkable free flowing on these metals and penetrate very quickly to considerable depth, the thin film between two closely fitted surfaces giving excellent strength and a sound joint with a minimum of solder. Thus used, silver solder is not too expensive. It, of course, should not be laid on heavily in a loosely fitted joint.

#### Silver Soldering for Small Pieces

Smaller storage tanks, as well as dyeing machines of all types and sizes for the textile industry, are made of light gauge metal, 0.050 in. or lighter and are fabricated by lock seaming and silver soldering. Silver solder is resistant to many of the corrosive conditions to which the high nickel alloys are resistant.

After the tank is entirely lock seamed, the seam is fluxed, top and bottom, to aid in the flow of the silver solder and dissolve the oxide on the underside. The flux used for this purpose is that mentioned above, being applied in thin paste form. Here again this flux is preferred to borax because the latter does not keep the metal as bright nor is it as easily removed. A silver solder of low melting point was developed in a co-operative research between Handy & Harman and The International Nickel Company. The flow point obtained, 1325° F. is valuable to prevent cracking the Monel and nickel. Solders of higher melting point are dangerous because they entail working in the red short range.

For this type of silver soldering we ordinarily use a very small oxyacetylene torch, or better yet, a lead burner's torch. The brazing goes along just as though welding, keeping only a small portion of solder molten, and always keeping the torch moving, preferably in line with the seam. The tip of the luminous flame is kept close to the surface of the pool. In doing this we avoid unnecessary heating of the sheet by the large envelope of the flame by getting the hottest part of the flame where it will do the most work quickly. Silver soldering does work somewhat faster than welding.

In the use of oxy-acetylene flame in silver soldering it should never be forgotten that the concentration of heat in a properly regulated flame is enormous and that the flow point of silver solders is much below the flame temperature. Too much heat is dangerous on these alloys. The sheet metal should never be hotter than necessary to thoroughly flow the silver solder, otherwise the sheet may be cracked. With proper care no difficulty will be experienced. Work should start about 2 in. or 3 in. from an edge and proceed toward the edge, to avoid serious difficulty.

Just recently a white brazing rod has been developed in the Union Carbide Laboratories which more nearly matches Monel and nickel in color than any previous rod and which has good corrosion resistant properties. Its strength and ductility are good. It fills in that gap between silver soldering and welding rod, flowing at about 1900° F., which is above the hot short range. This relatively high melting point is in its favor, since when brazing with it, the braze will have solidified and contracted slightly before reaching the hot short range of the sheet metal, at which temperature, any considerable amount of strain might cause cracking.

In conclusion, it is obvious that the use of the oxy-acetylene flame in joining the high nickel alloys is entirely practical for a wide variety of seams and forms of metal. The variations on the above general principles which can be made are many and the writer heartily endorses the use of this means of fusion in the manufacture of chemical apparatus.

# How to Handle Dangerous Acids

## Manufacturing Chemists' Association Issues New Instructions

The Steel Barrel and Drum Committee of the Manufacturing Chemists' Association under the chairmanship of T. P. Callahan, Merrimac Chemical, has issued a brief set of instructions on the handling and stowing of sulfuric and nitric acids. Plant managers are urged in the interest of plant safety and efficiency to see that copies of these suggestions are given to everyone likely to handle these chemicals.

### Empty Drums

1. Repairs should not be made on used drum until it has been thoroughly washed out with soda-ash solution. A good practice is, after washing, to fill the drum with soda-ash solution and allow it to stand twelve to fifteen hours before emptying.

2. Completely drain a drum before filling with water for washing purposes. This is very important especially in connection with oleum where crystals are liable to adhere to the side of the drum. In the latter case, an upright spray nozzle entering into the open drum placed with the bung downward and the water-control valve at a safe distance from the washing operation is a desirable feature. Such drums should have the washing apparatus located in the open because of fumes developed during the initial operation.

3. When drums have been emptied, the bung should be screwed in tightly to prevent further corrosion of threads.

4. It is not good practice to allow the bung to remain in a loosened condition as sulfating around bung hole results, which makes further use of the drum impossible and, at the same time, permits internal corrosion with the resulting gases which cannot escape after the bung hole is sealed by iron sulfate.

5. The wrecking of obsolete drums by the use of a pick to vent them is a very dangerous operation and should be discouraged.

6. Never use a naked flame in repairing a drum until it is thoroughly washed out and then the plug should be removed during the course of repairs.

### Filling Drums

7. Drums should be inspected and tested before filling and, drums showing a loss of 15 per cent of the original weight should be rejected as unfit for further transportation.

8. In filling drums a minimum of 3½-inch outage should be allowed. Stencil on each drum the strength of acid it contains,

also place a caution label on the shell sheet of the drum near the bung closure. The circular paper label, 4 inches in diameter, has black letters on red background, as follows:—

### CAUTION

Keep this Drum out of the Sun and Away from Heat

Keep the Bung up. When held in Storage, Remove

Plug every 6 or 7 Days to Release Pressure.

9. If possible, fill drums twenty-four hours before making shipment. It is poor practice to store filled drums anticipating orders.

### Full Drums

10. Store in cool place with the bung up. Keep out of direct sunlight and limit storage period to a minimum.

11. Release the bung at least once a week. Great care should be exercised in releasing the bung plug. A long-handled wrench should be used, and the operator's face should be turned away from the plug, for, should the drum be under built-up pressure, acid is liable to spurt from the opening. Goggles and rubber gloves afford protection against sprayed acid. The safe way is to give the plug a full turn and, if escaping pressure is apparent, allow the pressure to escape before further loosening the plug or removing it.

12. When discharging containers, no pressure should be applied. The gravity discharge method only should be employed.

The somewhat common practice of blowing sulfuric acid drums with air pressure is hazardous. While these drums have been known to stand a pressure of 60 pounds per square inch, considerable stress is set up on the drums when 10 pounds per square inch has been used, especially on drums which have been in service and show a thinning of the sheet in spots.

There is another danger in the handling of acid drums of vital importance. This occurs in the opening of the filled and the empty drums. This operation should always be performed with precaution, the bung should never be completely loosened until all of the gas has escaped. Furthermore, it is important that an open flame never be used to break the cake of sulphate which frequently holds the bung tightly, as the mixture of hydrogen and air present in the drum might cause a serious explosion if the bung is suddenly loosened.

## Equipment Bulletins

Stoker Mfrs. Association, Walker St., Detroit, Condensed Catalog of Mechanical Stokers, Third edition, revised and enlarged. Forty-eight different types of mechanical stokers, manufactured by fourteen member companies, Stoker Mfrs. Association, illustrated and described in a new forty-page condensed catalog prepared by the Association and now available for distribution. Various stokers are grouped into following classifications: multiple retort underfeed stokers, single retort underfeed stokers, chain grate stokers and overfeed stokers. Text is limited to engineering descriptions of various types of machines, and a supplementary section on engineering data relating to modern stoker practice is included.

Detroit Sheet Metal Works, Detroit, profusely illustrated 50 page booklet describing in detail process equipment, heating and ventilating equipment, etc.

F. J. Stokes Machine, Olney P. O., Philadelphia, Bulletin No. 100. A short review of the Stokes process equipment line.

Toch Bros., 386 4th Ave., N. Y. City. A 12 page summary of waterproofing compounds and maintenance paints with considerable data designed to aid in selecting proper materials for different sets of chemical conditions.

### Chemical Safety Section Elects

Safety Congress, Chemical Section elected following officers for current year. General Chairman—John S. Shaw, Hercules Powder; Vice-Chairman in Charge of Program—John Roach, Deputy Commissioner of Labor, Trenton, N. J.; Vice-Chairman in Charge of Membership—A. L. Armstrong, Eastman Kodak; Secretary and News-Letter Editor—Ralph O. Keefer, Aluminum Company of America; Poster Committee Chairman—S. H. McKenty, Atlantic Refining Co.; Statistics Committee Chairman—Ira V. Kepner, Pennsylvania Salt Manufacturing; Engineering Committee Chairman—G. H. Miller, duPont, Wilmington, Del.; Industrial Poisons Committee Chairman—Dr. Leonard Greenburg, Yale Medical School, New Haven, Conn.

## The Industry's Bookshelf

**Foreign Trade in 1931**, 518 pages, \$2.50, published by Nat'l Foreign Trade Council, N. Y.

Official proceedings of the National Foreign Trade Convention held in New York City, May 27-29, 1931. Of particular interest to the executive foreign trade and to students of present trends in our foreign trade and international economic relationship.

**Wages in the United States, 1914-1932**, 241 pages, \$3.00, published by Nat'l. Industrial Conference B'd, N. Y.

With wage discussions on everyone's lips this eighteenth contribution to the knowledge of current wage conditions in this country takes on special significance. An impartial review. Should be read by those dealing with the practical side of the problem of fixing wages and by those dealing with personnel problems.

**Organized Business Leadership**, by Merle Thorpe, 116 pages, \$2.50, published by Harper, N. Y.

This well-known business leader has summarized economic principles in a clear and intensely practical way, pointing out the paths that the trade association must take to insure the benefits of business stabilization that potentially are possible through this medium of group action.

**The Chemistry Flavouring and Manufacture of Chocolate Confectionery and Cocoa**, by H. R. Jensen, 406 pages, \$7.50, published by P. Blakiston's Son & Co., Philadelphia, Pa.

A splendid review of modern manufacturing methods. Of special importance to the technical and non-technical and practical men of the industry alike. A complete reference book on the cocoa and chocolate industry.

**Patent Law for Chemists, Engineers and Executives**, by Fred H. Rhodes, 207 pages, published by McGraw-Hill Book Co., Inc., N. Y. \$2.50.

A broad, general treatment of the law of patents, explaining the requirements for a patentable invention and the rights conferred by a patent.

**A Century of Wood-Preserving**, by Sir Harold Boulton, 150 pages, published by P. Allan & Co., London. 8s. 6d.

A history of the development of the science and practice of creosoting timber, illustrated with plates showing the construction of tar distilling and creosoting plants.

**Makers of Chemistry**, by Eric John Holmyard, 314 pages, published by Oxford Press, N. Y. \$2.50.

A story of chemistry from its remote and obscure beginnings to the present day, liberally illustrated, intended primarily for the general reader.

**The Quantity and Sources of Our Petroleum Supplies**, by John M. MacFarlane, 250 pages, published by Noel Press Co., Philadelphia. \$3.00.

A detailed study of the formation of several rich deposits of oil rock in North America, with estimates of the probable future supply of petroleum.

**Concrete Design and Construction**, by Walter Loring Webb and W. Herbert Gibson, 399 pages, published by American Technical Society, Chicago. \$3.00.

A practical handbook on concrete, including mixtures, tests, beam and slab design, construction work, retaining walls, etc.

**Industrial Organization**, by Harry Rubey, 318 pages, published by Ginn and Co., Boston. \$2.80.

A text which is designed to give the engineer and other highly specialized technical men a summary of the theory and practice of large and complex business organizations.

**Economics**, by Frank Tracy Carlton, 380 pages, published by D. C. Heath & Co., Boston. \$2.40.

A short text for college students, covering the fundamentals in economics, with a minimum of abstract theoretical discussion.

## Acetylene Association Holds 32nd Meeting

Depression failed to dim interest or decrease attendance at the 32nd annual convention, International Acetylene Association held at the Congress Hotel, Chicago, Nov. 11-13. Last



**Prof. Norman W. Krase**  
Leads chemical discussions

year's meeting attracted 400 while over 1,400 attended sessions at the Congress. From the chemical and process industries' viewpoint, the most important part of the proceedings was held Friday. "Welding in the Chemical Industry" with Dr. Norman W. Krase, Professor of Chemical Engineering, Illinois and particularly well-known for his work on high pressures and because of this, well equipped to lead the discussion of welding of chemical pressure vessels into profitable channels. The papers presented follow:

"Gas Welding Opportunities under the Revised A. S. M. E. Boiler Code", by Charles E. Gorton, Chairman, Uniform Boiler Law Society; "Some Methods and Effects of Machine Gas Cutting" by L. M. Curtiss, Lukens Steel, Coatesville, Pa.; "Gas Welded and Brazed Joints for High Nickel Alloys" by F. G. Flocke, J. G. Schoener, and R. J. McKay, Engineers, International Nickel; "Management of Large Piping Installations" by G. E. Detheridge, Construction Supt. Carbide and Carbon Chemicals, South Charleston, W. Va.

## New L. C. L. Refrigeration Service

First actual commercial shipment of a perishable product in a small less carload container was made by the Atlantic Coast Fisheries from New York to Syracuse, via Rochester. This was a shipment of frozen fish and even temperatures were maintained for 66 hours, maximum temperature reached being  $-18^{\circ}\text{F}$ .

This shipment was made in the Church Freight Service container, equipped with an ICEFIN temperature control unit, illustrated herewith. The refrigeration and temperature control was worked out and furnished by Solid Carbonic. This container was shipped in an ordinary box car over the Lehigh Valley road to Rochester and thence to Syracuse over the New York Central Road.

The fact that this container can be loaded in the shippers own plant, refrigerated within itself, carried in an ordinary box car and then delivered direct to the consignee makes possible the material broadening of the perishable food market.



**New L. C. L. Refrigeration Unit**

## Rosin Symposium Available

A. S. T. M. has available in convenient booklet form the eight papers given at the 1930 symposium on rosin. Copies are available at A. S. T. M. headquarters, 1315 Spruce St., Philadelphia. Price 60 cents.



**Bichromate of Soda**  
**Bichromate of Potash**  
**Chromic Acid**  
**Oxalic Acid**



*“Mutualize Your Chrome Department”*

**MUTUAL CHEMICAL CO. OF AMERICA**  
270 Madison Avenue  
New York, N. Y.

**Factories at Baltimore and Jersey City**

**Mines in New Caledonia**

# Chemical Facts and Figures

## Muscle Shoals Committee Reports—Copper Conference Successful—Alcohol Production Schedule—Naval Stores Stabilization—Favorable Angles to Export Situation—Du Pont Announces Synthetic Rubber.

"Preference as a lessee should be accorded a corporation exclusively owned and controlled by organizations of farmers operated without profit." Number seven in list of conclusions and recommendations made by present Muscle Shoals Commission to President Hoover points to further complications in any attempted settlement of Congress's most provoking problem.

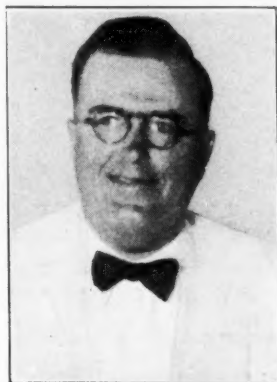
### Private Operation?

Commission unanimously arrived at following conclusions after considerable study and several hearings held in Washington and in various points in the South.

1. It is economically feasible and desirable to use and operate Muscle Shoals properties for the following purposes: Primarily for quantity production of types of commercial fertilizer and/or fertilizer ingredients of greater concentration, than those which are now generally sold to the farmers; cooperative scientific research and experimentation for the betterment of agriculture; manufacture of chemicals.

2. It is the definite conclusion of the Commission that the foregoing public benefits can best be obtained by private operation under lease contracts through competitive negotiations.

The Commission recommends the enactment of the necessary enabling legislation



**Chairman Hobbs  
and his Muscle Shoals Conferees  
favor farmer ownership**

by Congress empowering the President or such agency as he may select to negotiate and to conclude a lease contract for the

United States properties at Muscle Shoals, and to supervise operations.

### 50 Year Lease

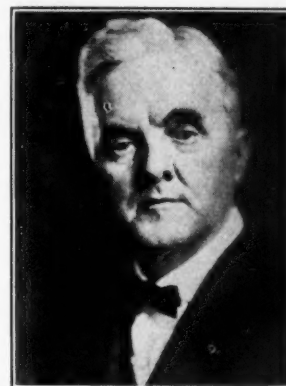
Other important recommendations briefly summarized call for guaranteed allocation of all power necessary for the production of a required initial minimum amount of fertilizer or fertilizer ingredients and for the production of increasing amounts from time to time in response to reasonable market demands, and for the manufacture of chemicals; lessee shall pay a fair and reasonable rental on mutually agreeable terms with lease to run 50 years: power rentals accruing to the U. S. and proceeds from lease or sale of surplus property should be expended not exceeding 25 per cent for research and investigation under the direction of a Board to be named from organized agriculture, and not exceeding 75 per cent for the creation of a revolving fund for the operation and financing of the purchasing and storage of fertilizer and fertilizer material, and the development of better methods of manufacture and distribution of fertilizer by a

farmers co-operative, representing national farm organizations.

### Advice Disregarded

Significant is the report sent to the Commission by Henry G. Knight, Chief of the Fixed Nitrogen Research Laboratory in answer to the Commission's request for an expression of opinions to the necessity of Muscle Shoals in our national defense.

"It is the consensus of opinion in this Bureau that the Muscle Shoals project is no longer necessary for the production of



**Senator Norris  
"It looks like it's full of tricks"**

nitrogen for national defense. The nitrogen situation in the U. S. has undergone a decided change during the 13 years since the Government nitrate plants were constructed and, as a result, this country is now able to produce the nitrogen required for any probable defense program."

Dissatisfaction with report was immediately expressed by Senator Norris, leader of progressive group and author of bill calling for government operation of Muscle Shoals. Senator Charles L. McNary, Oregon, chairman of the Committee on Agriculture, also was critical.

"It looks like it's full of tricks," said Mr. Norris, according to Associated Press despatches. "I have only seen a synopsis, but it is just what might be expected. It was another Hoover commission appointed to carry out Hoover's ideas."

"It is apparently the old trick of getting power for the chemical interests under the guise of a farmer's program," he added.

Text of President's statement on making the report public was as follows:

I am issuing the unanimous report of the Commission on Muscle Shoals. This commission was appointed to recommend methods for the disposal of Muscle Shoals, and consists of three members each appointed by the Legislatures and Governors of the States of Alabama and Ten-

### THE MONTH REVIEWED

Nov.

- 2 Du Pont announces synthetic rubber (613).
- 9 Bondholders and stockholders, American Solvents & Chemical form protective committees (616).
- 10 "Cosach" terms attacked by Chilean Commission (577).
- 12 U. S. Timber Commission Acts to Stabilize Naval Stores (614).
- 13 British Dye Restrictions to be continued (570).
- 14 Muscle Shoals Reports to President Hoover (609).
- 19 Dr. William J. Hale, Dow, addresses Coal Conference (579).
- 24 French threatens virtual restriction of nitrate imports (570).
- 28 Belgium Katanga agrees to copper curtailment (610).

nessee, together with one member from the Engineer Corps, one from the Judge Advocate General's office and one from the agriculture organizations.

The commission has made a four months' intensive study of the subject, has had many public hearings at which all interested parties have been encouraged to send representatives. It is a representative body, and its conclusions speak for themselves. At an appropriate time I shall transmit the report to the Congress.

### "Off Again, On Again"

Belgian Congo's prolific copper producer, represented by Belgian Minister of State, Emile Francqui, Fernand Pisart, copper miner extraordinary, and his co-partner, Camille Gutt, attempted to drive



They sailed and copper sulfate went to \$3.10. Left to right, E. Francqui, C. Gutt, and F. Pisart

a hard bargain at the informal international copper producer's conference in New York last month. With the issue sharply drawn—Katanga (65 per cent, Belgium Government owned) against the rest of the world—Francqui & Company rushed off in a supposed huff, sailing on the Europa Nov. 17, and declaring they could not and would not accept plan offered permitting sale annually of 115,000, 000 pounds, about 26 per cent of Katanga capacity.

Copper within a week fell to 6¼ cents, lowest figure ever known to prevail in the domestic market and copper producing companies' stocks made equally rapid descent. Copper sulfate, always carefully attuned to the metal market, reached \$3.10, also a new low for all time. But Messrs. Francqui, Pisart, and Gutt were merely stalling for time and an opportunity to confer with principals in Brussels. Press dispatches, Nov. 28, announced that Katanga was decidedly in as Phelps-Dodge (large American producer) issued statement withdrawing from Copper Exporters,—said in most

quarters to be merely a move to force Katanga's acquiescence. Little doubt existed but what Phelps Dodge would reconsider action with Katanga's re-entrance into the fold. Copper market firmed at once with producers withdrawing 6¼ cent quotation.

## Washington

Chairman Fletcher's resignation (Nov. 30) leaves two vacancies to be filled on Tariff Commission. One of these places must be filled by a Democrat and the other by a Republican.

Tariff Commission investigations on petroleum, copper and vegetable oils are in final form and will be submitted to Congress when it convenes next month. Chairman Fletcher said in his letter of resignation to President Hoover.

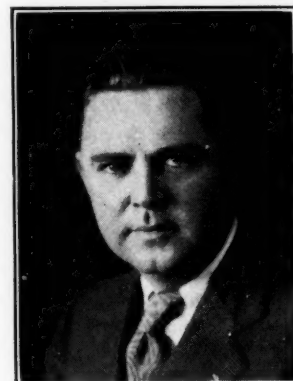
Application has been received by Tariff Commission for hearing on application for an increase in duty on antimony oxide, antimony regulus and antimony metal, made by Texas Mining & Smelting, Laredo, Texas.

### Alcohol Controlled

Increased production schedules are distinctly in disfavor in alcohol industry. During 1932 about 85,000,000 wine gallons of industrial alcohol will be manufactured under permits issued by the Treasury Department's prohibition unit. At conference of concerns which manufacture approximately 90% of the permitted industrial alcohol and prohibition unit, it was generally agreed that permits would be issued for manufacture of approximately the same amount of alcohol next year as was produced this year. Concerns represented were U. S. I., du Pont, Union Carbide, Pennsylvania Sugar, Publiker, American Solvents and Syrup Products.

## Soviet To Blame ?

"Steel industry has stifled and throttled development and production of domestic manganese by buying ore dumped by



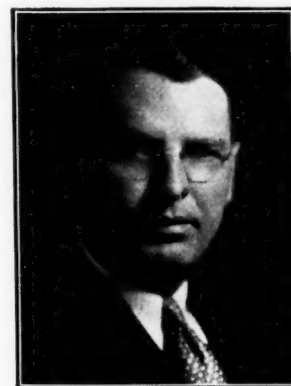
J. Carson Adkerson  
Takes steel producers to task

Soviet producers" charged American Manganese Producers' Association President J. Carson Adkerson in opening new drive for embargo.

Efforts to obtain such an embargo against manganese ore and other products from Soviet Russia will be renewed at the coming session of Congress. Support for Manganese Association was pledged in telegram from U. S. Senator Tasker L. Oddie, Nev., chairman, Senate Committee on Mines and Mining.

### Reese's Successor

James William McLaughlin, vice-president, Union Carbide and treasurer, Manufacturing Chemists' Association, appointed member Advisory Council, Bureau of Industrial Alcohol by Commissioner Doran. He succeeds Dr. Charles L. Reese, recently retired duPont vice-president.



James William McLaughlin  
Synthetic alcohol recognized

Synthetic production is accorded representation on the Council with Mr. McLaughlin's appointment.

Mr. McLaughlin has been with Carbide since 1918. He is vice-president Niacet Chemicals; is forty years old; born in Paris, Ill.; graduated from University of Illinois with B. S. degree in engineering, 1914.

## Chemical Business at a Glance

### Shipments

Below October—lowest month for the year

### Prices

Fairly firm, fertilizer and naval stores higher

### Employment

Slightly higher in October

### Payrolls

October under September

### Inventories

Higher

### Stock Prices

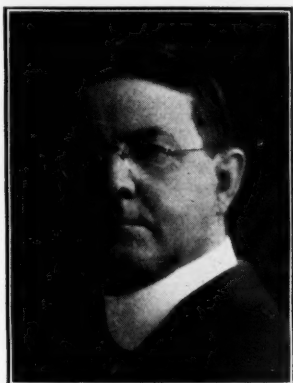
Lower

### Bond Prices

Lower

## Honored

Morehead Medal was established in 1922 by John M. Morehead in honor of his father, the late James Turner Morehead, who in 1892 sponsored discovery of electric furnace method of producing calcium



**A. Cressy Morrison**  
Serves Acetylene Association  
25 years

carbide. International Acetylene Association awards a Morehead Medal annually to the person or persons who in the judgment of its Officers and Board of Directors have done most to advance the industry or the art of producing or utilizing calcium carbide or its derivatives.

This year, 1930 Medal is awarded to A. Cressy Morrison, Union Carbide, whose services as Secretary-Treasurer, for past 25 years have been of incalculable value to acetylene industry. Mr. Morrison, truly one of the pioneers of this organization and of the acetylene industry, has untiringly devoted a large portion of his life and a major portion of his efforts to administration and leadership in this field.

## Jobs

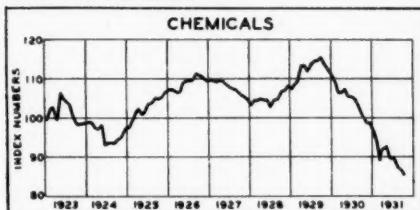
Chemical and allied industries made favorable showing in employment when comparison is made with other industries most of which showed declines in October over September both in employment and payroll totals. Chemical and allied industries figures as published by U. S. Dept. of Labor show employment gains but losses in payroll totals indicating further prevalence of wage reductions.

(Monthly Average 1926 = 100).

	Employment		Payroll Totals	
	Oct. 1930	Sept. 1931	Oct. 1930	Sept. 1931
Manufacturing Industries	78.6	69.6	67.3	72.7
General index	78.6	69.6	67.3	72.7
Chemicals and allied products	89.3	74.3	73.9	90.3
Chemicals	94.5	85.2	85.5	92.8
Fertilizers	80.6	50.1	49.0	77.5
Petroleum refining	86.2	69.9	68.8	90.1

## Employment

U. S. Bureau of Labor.



Dec. '31: XXIX, 6

## COMING EVENTS

**American Drug Mfrs. Association**, Greenbrier, White Sulphur Springs, Apr. 18-21, 1932.

**American Scientific Congress**, Mexico City, Feb. 5, 1932.

**Chicago Drug & Chemical Association Christmas Dinner**, Stevens, Dec. 17.

**Electrochemical Society, Spring Meeting**, Baltimore, Apr. 21-23.

**Materials Handling Exposition** indefinitely postponed.

**Perkin Medal Presentation**, N. Y. City, Jan. 8, 1932.

**Salesmen's Association Christmas Dinner Party**, Dec. 29, Hotel New Yorker.

**Technical Association of the Pulp and Paper Industry**, N. Y. City, third week of February.

## Stauffer Growth

Stauffer Chemical formed Pacific Hard Rubber, general offices, 715 Rives Strong Building, Los Angeles. Officers are: John Stauffer, Jr., president; Herbert King, vice-president; W. C. King, Sec'y-treasurer. Manufacturing plant is now being constructed for manufacture of hard rubber battery containers. Plant will be equipped with the most modern machinery obtainable and will have an initial capacity of 1,000 boxes per day including a complete line of sixes in ledge type, semi-ledge and finger hole design. Firm will be closely associated with United Rubber Corp., San Francisco, manufacturers of hard rubber covers and vent plugs. Production scheduled for Feb. 1, 1932.

## Still More Potash

In a test which U. S. Bureau of Mines is conducting in Lea County, New Mexico, ten-foot bed of sylvite, a form of potash, was encountered at an easily workable depth. Location of test well is one and one-half miles south of Getty oil field. Additional test wells will be drilled to determine area and possible tonnage of sylvite.

Naval stores manufacturers and dealers are not exempted from payment of the States sales tax, Georgia Tax Commissioner Paul Doyal announced in new ruling, repealing a rule put into effect by his predecessor in office.

Chemical Markets

## I. C. C. Rulings

I. C. C. sustained complaint of Cyanamid against railroads generally and held as unreasonable rates on cyanamid from Niagara Falls, Ontario to destinations in central and southern territories. Decision awards reparation for overcharges on past shipments.

I. C. C. reaffirmed previous decision fixing maximum rates on liquid tanning extract in car loads from Lynchburg, Charlottesville, Waynesboro and Buena Vista, Va., to Durbin, W. Va., and Baltimore, Md., at 22 cents and 23 cents per cwt., respectively.

Complaint that previous rates were unreasonable was made by Pocahontas Tanning, against the Chesapeake & Ohio Railway. Case was reopened at request of tanning company.

Supreme Court decided that I. C. C. acted within its authority when it reduced freight rates on fertilizer in Central Freight Association territory in 1928. Case was decided by commission July 11, 1928, and new rates which represented an average reduction of \$1.10 per ton became effective Oct. 5, 1928.

Annual saving to Mid-West farmers in years of normal fertilizer consumption is estimated at \$750,000 by Charles J. Brand, executive secretary, National Fertilizer Association.

## "Merchandising" Chemicals

New type of service organization, to facilitate marketing of industrial products, is formed by Dr. H. H. Sheldon, H. A. Morse, L. W. Hutchins, and Dr. W. H. Easton, all well-known in many branches of industry, engineering and science. Company, with offices at 191 W. 10th St., N. Y. City, will be known as Sheldon, Morse, Hutchins and Easton.



**L. H. Hutchins**  
Expands promotional activities

Group will give special attention to commercial problems arising in connection with scientific research by assisting manufacturers to determine applications and markets for products in laboratory or development stages, estimate amount of research expenditures that are economic-

611

ally justified, make surveys of competition and patents, and plan supplementary research work and the development of new products to meet market conditions. Company also plans to furnish manufacturers with complete sales research, advertising, and publicity service.

Dr. Sheldon is chairman Physics Department, Washington Square College, New York University, research scientist and engineer, consulting science editor of the New York Herald Tribune.

Mr. Morris is president of H. A. Morse, Inc., industrial advertising and marketing counsel; Mr. Hutchins is Director of Public Relations for Swann chemical companies, and is director of The American Institute, and at the moment, is in charge of The Children's Science Fair at the New York Museum of Natural History.

### Personal

Dr. Charles H. Herty, former president A. C. S. and Synthetic Organic Chemical Manufacturers' Association, speaking at annual meeting of U. S. Institute for Textile Research, urged formation of an all-embracing government bureau financed by Senatorial appropriations and assisted by industry, to furnish thorough, complete and "live" information on production, importations and consumption, as a means of combating unhealthy booms and depressions.

At conclusion of the talk, Toastmaster Dr. E. H. Killheffer, urged speaker to accept presidency of the Institute, the position recently vacated by the death of Dr. Samuel W. Stratton, late chairman, M. I. T.

"I am forced to refuse on account of demands of experiments which I am conducting in the South in the hope of developing a means of making paper pulp from yellow pine," said Dr. Herty.

### Gen. Metz Commands

Herman A. Metz is chairman for the appeal of the United Hospital Fund of New York in drugs, chemicals and dyes. Last year drugs, chemicals, and dyestuffs trade contributed \$2,565 to United Hospital Fund for support of free work in its 55 member hospitals. It is estimated that their requirements this year for carrying on this free service will approximate \$5,000,000.

Howard W. Matheson, vice-president in charge of research, Shawinigan Chemicals, Ltd., Montreal, made honorary member, Society of Chemical Industry.

H. H. Robertson of Pittsburgh, leading figure in studies to prevent corrosion in chemical plant buildings, is named on a super-committee to bring the heads of some big corporations into active participation in safety movement. New group is to be known as Special Advisory Committee, National Safety Council. Its purpose is to broaden whole activity of the safety movement.

## Obituaries

### Prof. Walter Reid

Prof. Walter Reid, 81, noted chemical scientist, first Englishman to investigate rubber industry in Brazil, inventor of smokeless powder, died a recluse, Nov. 18, at Kingston Hospital, London.

His hair was long, touching his shoulders, his beard reached to his waist. Doctors said he apparently lived on bread and milk.

Milkman, W. Tolworthy, said he had served Reid for forty years, but had not seen him in the last two years. Reid paid him by putting pound notes in empty milk bottles. He never answered the door.

Thomas A. Kirkham, president Berkshire Chemical, Bridgeport, Conn., from 1913 to 1929, died Nov. 4. Failing health the latter part of 1929 forced sale of his business to Davison Chemical.

Mr. Kirkham has been identified with fertilizer industry since 1882, and was well-known throughout the trade in the East and particularly in New England, in which territory he always took an active interest in district meetings and conferences.

### DuPont and Six Hour Day

"Prosperity is coming back to the United States . . . and it is going to be a greater prosperity than we have ever known."

"The reason is simple. Our industrial plants, under white light of depression, have been subjected to scrutiny, and many are now being wisely reorganized."

Speaker, M. duPont Lee, grandson of founder of duPont Company, and vice-president of two of the corporations of the present duPont network, which controls some 50,000 workers in sixty or more cities—the listener, Laura Vitray, special



President Lamont duPont Practices what he "preaches"

writer for N. Y. evening daily paper, New York Evening Journal, engaged in making surveys of six hour working day in industries.

The five duPont factories where the six-hour day is already in operation are situated at Buffalo, Old Hickory, Waynes-

boro, Va.; Richmond, Va., and Wilmington, Del. Payroll of approximately 7,000 employees three months ago has been increased to almost 10,000.

Hourly wage rate in these plants has remained the same as before, so that the workers have in most cases suffered a certain diminution in earnings. But this has been offset to some extent by the fact that bonus rate is paid for production above a fixed amount, and with shorter hours employe efficiency has increased.

Manufacturing Chemists' Association President, Lamont M. duPont, second in command of the far-flung duPont interests, reporting only to Pierre S. duPont, chairman of the Board, is leading advocate of the six hour day and is urging chemical industry generally to adopt plan already successfully tried in duPont plants.

### Personnel

Directors of B. F. Drakenfeld elected Scott J. Courtney as president to fill vacancy caused by death of the late B. F. Drakenfeld.

Ward H. Sachs appointed agronomist for the American Cyanamid Co. in Southeastern States effective Dec. 1. His headquarters will be at Atlanta.

William F. Talbot joined research staff Gustavus J. Esselen, Boston. Mr. Talbot was formerly member teaching staff University of Iowa and subsequently connected with experimental station of du Pont at Wilmington.

W. S. Fallis elected chairman, Sherwin-Williams, of Canada, George A. Martin, president Sherwin-Williams, Cleveland, succeeds Mr. Fallis as president Canadian company. E. M. Richardson, N. Y. elected director.

Ralph E. Pettit joined Aluminum Colors, Inc., at Indianapolis. He was formerly associated with research department of the Aluminum Co.

G. W. Bibby is associated with Maryland Chemical, Baltimore.

J. R. Hoover, formerly manager of chemical laboratories B. F. Goodrich Co., has been appointed to chemical sales division and L. M. Freeman becomes the new manager of laboratories.

### Duriron Appoints

Duriron appointed H. P. Rodgers representative for Cleveland territory, with offices, 528 Leader Building. Duriron licensed Shawinigan Chemical, Montreal, to produce Duriron and Duriron equipment for Canada and Newfoundland. Company will make complete line. Is first instance of foreign company being granted manufacturing license for Duriron.

International Combustion sold, under approval of Court acting on petition of receiver, N. J. Coal & Tar, subsidiary. Plant designed for low distillation of coal, located at New Brunswick, brought \$75,165 to former owner.

W. P. Fuller & Co., San Francisco and R. N. Nason & Co., accepted du Pont Duco patents; Fuller granted du Pont exclusive license, with right to sub-license, under Dexter J. Tight patent, No. 1,756,528, dated April 29, 1930, covering dull-finish or "flat" transparent lacquers. As result Tight patent, which threatened further patent complications in manufacture and sale of dull-finish transparent lacquers, is available to all du Pont licensees without additional royalty. Bradley & Vrooman, Chicago also recently accepted a du Pont license, making a total of 45 concerns now licensed to operate under Duco patents.

Tulsite Chemical, Tulsa, reorganized, occupied building at Hale Station to manufacture chemical soap.

Nevada Quicksilver, Ione, Nev., installed new and larger equipment.

Grasselli's Niles, Ohio, plant personnel, 65 strong, returned to sulfuric acid manufacture on six hour day basis, four shifts daily.

Du Pont developed chemical compound, "Lignasan", for use in treatment of air-dried lumber to control sap stain or "blue stain" and to prevent mold. Treatment is applied in cold solution by dipping or spraying and has been found to be effective on pine, sap gum, black gum, yellow popular, magnolia and certain other hardwoods. The cost of the treatment is approximately 12 cents per thousand feet of lumber, board measure.

Koppers has developed process for low temperature carbonization of coal, actual use of which awaits only improvement in general business conditions. F. Puening, research specialist told Third International Conference on Bituminous Coal.

Industrial Equipment Co., (G. G. Crewson and Arthur E. Smith), formerly representing Duriron in Buffalo territory, is dissolved. Duriron is opening direct sales office in Buffalo under management of Guy A. Baker, of the Dayton general office.

C. H. Boehringer Sohn, Nieder-Ingelheim and Hamburg, Germany, entrusted R. W. Grieff with agency formerly held by Eckford Chemical, whose president, T. N. Dissosway, died recently. Stocks of Boehringer's products, including lactic acid and lactates, tartaric acid and salts, fine alkaloids are carried in N. Y. City.

## Company News

### Synthetic Rubber

Fate intervened to prevent Thomas A. Edison from witnessing his last great problem and his proposed solution seriously challenged. Du Pont chemists, speaking at A. C. S. Rubber Division meeting, Akron, Nov. 2, reported "Duprene" new synthetic rubber (Rotogravure Section). Primary raw material is acetylene, requiring for its production only coal and limestone. Other raw materials are salt and water. New synthetic rubber is made by controlled polymerization of chloroprene and chloroprene is made by the catalytic polymerization of acetylene to mono-vinylacetylene, which is then treated with hydrogen chloride to produce chloroprene. This chemical result led to selection of "Duprene" as trade name.

Simple as the process sounds, it required concentrated efforts of more than score of chemists over a period of several years to find proper conditions for bringing together these abundant raw materials to produce synthetic rubber.

New rubber, according to the announcement, has many commercially valuable qualities which will supplement present uses of natural rubber, since there are certain important differences in properties of new product compared with natural. While not yet advanced to point where it can be substituted for natural rubber in its wider ranges of everyday use, those who have been active in its development feel that further effort may greatly enlarge its field of usefulness.

### Resistance to Solvents

Among valuable properties is greater resistance than natural rubber to the swelling action of gasoline, kerosene and other solvents that are notoriously harmful to rubber. It is also more resistant to oxygen, ozone and many chemicals that

attack rubber. Most interesting feature is that of vulcanization by application of heat alone. Another important disclosure was that an artificial latex can be made from chloroprene. The artificial latex is milk-like liquid consisting of particles of fully vulcanized synthetic rubber suspended in water. Upon drying, a sheet of fully vulcanized rubber is obtained. Duprene latex differs radically from natural latex because of its increased penetrating power so that it becomes possible to impregnate many porous materials that cannot be impregnated with natural rubber latex.

Utah Sulphur Industries plans to resume operations at Sulphurdale, Utah, properties Mar. 1, 1932.

Solvay Sales, Boston office, formerly 77 Summer st., now located at 1 Federal street.

Westmoreland Products, New Castle, Pa., organized several months ago, started operations. Manufactures iron oxide and iron blues from waste products of Shenango works, American Sheet & Tin Plate. Company filed application for basic patent on new and reported cheaper process for manufacture of copperas, the plant's raw material.

Heyden Chemical Co. enclosed special notice in November price list, calling attention to late decline in acetylsalicylic acid, calomel, corrosive sublimate, ammoniated mercury, U. S. P., and mercury oxide, red and yellow.

Chemicolloid Laboratories appointed Schiller Engineering, Detroit, northern Ohio and northern Indiana agents on Chemicolloid line of colloid mills.



Plant at Deepwater Point, N. J., erected by du Pont for the manufacture of Duprene, new synthetic rubber, development of which has been announced after many years of research

## U. S. Chemical Exports

Export gains were made for certain newer American chemicals in first nine months according to figures prepared by A. H. Swift, Chemical Division, Dept. of Commerce. Nearly 50 commodities recorded increases compared with corresponding nine months of 1930, although total exports fell 24 per cent in value, from \$134,219,000 to \$101,883,000. Nor have there been price declines in all commodities although generally decreased prices were partly responsible for loss in total value. It may be that export trade indicates character of American chemical industry, since comparatively large increases have been made in commodities which were relatively new, or, if old, commodities for which new uses have proven satisfactory.

## Calcium Chloride Sales

With discovery of the suitability of calcium chloride in road work, and also for minor specific purposes, exports have been gaining steadily and during the current three-quarter period exceeded \$534,000 (46,000,000 pounds). Exports of miscellaneous agricultural insecticides, household disinfectants, deodorants, and similar compounds; acetone; miscellaneous synthetic organic chemicals; nitrocellulose and acetocellulose solutions; and lacquers—all in the category of newer American commodities—expanded during period under discussion. Other industrial chemicals in which undoubtedly the marked fall in price was a contributing cause to greater business were copper sulfate, which doubled in quantities shipped, and sodium cyanide, sodium sulfate, caustic, tin compounds, chlorine, and gases other than ammonia. Sodium borate, however, recorded an increase in value to \$2,497,000, but a small loss in quantity to 126,000,000 pounds.

## Carbon Black Gains

Five per cent more carbon black, or a total of 68,900,000 pounds, were exported during the 9-month period of the current year, although values declined 20 per cent to \$3,700,000. Shipments of paste paint more than doubled in quantity, to 3,173,000 pounds (\$400,000).



## Good Example

W. G. Marshall, Westinghouse, gives to unemployed, \$200 check received for best industrial relations plan

## Almost Too Late!

Carbide officially announces Synthetic Butyl Alcohol; Tariff on crude feldspar reduced 50c.

## Help!

Chairman Bowker, N. Y. Employment Relief Committee, Chemical and Paint Division head announced, Nov. 30, that although subscriptions and contributions so far received amount to approximately \$91,000.00, many more thousands of dollars are necessary to attain the quota set for his division.

Mr. Bowker reported many companies in the chemical and paint industries have not yet sent in their subscriptions and that prompt cooperation from them is necessary to the success of the drive.

Checks should be made payable to Emergency Unemployment Relief Committee and forwarded to Mr. A. W. Goeller, Treasurer, American Agricultural Chemical Co., 420 Lexington Ave., or to main Committee, with offices 29 Broadway N. Y. City.

## Contributions to the Chemical and Paint Division of \$100 or over as of Nov. 29th:

Alaska Chemical Company.....	\$ 300.00
American Agricultural Chemical Company, The.....	1,500.00
American Agricultural Chemical Company, The—Employees.....	1,601.50
Adams, C. E.....	500.00
Air Reduction Corporation.....	1,500.00
Air Reduction Corporation—Employees.....	3,969.60
American Commercial Alcohol Company, The.....	627.58
American I. G. Chemical Corporation.....	1,200.00
American Maize Products Company.....	900.00
Babbitt, B. T. Inc.....	500.00
Baltimore Copper Paint Company.....	200.00
Beard, Wm.....	150.00
Bowker, Horace.....	300.00
Brewster, G. S.....	2,500.00
Boyle, A. R. M.....	100.00
Binney & Smith.....	100.00
Burroughs Wellcome & Co., Inc.....	1,300.00
Campbell, John & Co.....	200.00
Chemical Solvents, Inc.....	100.00
Celluloid Corporation—Employees.....	349.50
Columbian Carbon Co.....	250.00
Commercial Solvents Corp.....	1,500.00
Ciba Company, Inc.....	6,957.87
Commercial Acetylene Supply Co.....	500.00
Commercial Acetylene Supply Co.—Employees.....	877.50
Duche & Sons, T. M.....	300.00
Devos & Reynolds and Employees.....	6,830.70
DuPont De Nemours & Co., Inc.....	3,280.00
Debevoise, Mr. & Mrs. George.....	300.00
Egyptian Lacquer.....	100.00
Federal Composition & Paint Co.....	150.00
Gillespie, J. T.....	200.00
Gray, Wm. S.....	500.00
Grace, Morgan H.....	100.00
Gillespie-Rogers-Pyatt Co., Inc.....	200.00
Haskell, S. B.....	100.00
Hamann, Wm. A.....	250.00
Haynes, Wm.....	346.85
Haskell, Glenn & Employees.....	1,500.00
Innis Speiden & Co. Employees.....	315.00
International Agricultural Corp.....	1,021.00
I. A. C. John J. Watson.....	500.00
Judson, Wilbur.....	1,000.00
Kohnstamm & Co., Inc.....	1,250.00
Lavanburg—Employees.....	538.00
La Boyteaux, William.....	500.00
Lavanburg, Fred L. Co.....	250.00
Leghorn Trading Co.....	540.00
Litter Co. D. H.—Employees.....	200.00
Moore, Benj. & Co.—Employees.....	104.25
Mathieson Alkali Works—Employees.....	1,175.00
Mutual Chemical Co. of America.....	500.00
Mac Lac Kasebier Chatfield Corp.....	200.00
Mellravy, W. N.....	500.00
National Carbide Co.....	360.00
N. J. Zinc Co.....	6,878.00
Oakland Chemical Co.....	100.00
Oakland Chemical Co.—Employees.....	365.60
Ore & Chem. Corp.....	100.00
Phosphate Export Assoc. Employees.....	132.00
Powell & Co., Inc., Jno.....	229.00
Red Hand Compositions Co., Inc.....	500.00
Robinson, Edward E.....	100.00
Seck & Kade, Inc.....	100.00
Schieffelin & Co. and Employees.....	2,500.00
Swann & Co.—Employees.....	148.00
Sundheimer, Henry.....	100.00
Stanco, Inc.—Employees.....	156.00
Sapolin Co., Inc.....	305.00
Sheaff, J. C.....	100.00
Sameth Exterminating Co.—Employees.....	1,741.74
Stillman and Van Sien, Inc.....	100.00
Stroock & Wittenberg—Employees.....	170.00
Sterno Corp.....	150.00
Simon, E. (See Ore & Chem. Corp.).....	
Texas Gulf Sulphur Co.—Employees.....	855.00
Thompson, S. W.....	100.00
Thom, W. B.....	100.00
Texas Gulf Sulphur Co.....	7,500.00
Union Solvents Corp.....	100.00
Union Carbide Co.—Employees.....	1,709.00
Union Carbide Co.....	7,500.00
Uhlich, Paul.....	250.00
Utility Co., Inc.....	900.00
U. S. Industrial Alcohol Co.....	1,500.00
Wailes-Dove-Hermiston Corp.....	1,000.00
Watson, John J.....	500.00
Westvaco Co.....	300.00
Westvaco Co.—Employees.....	437.00
Yates, F. B.....	200.00
Zinsser, Rudolph.....	150.00
Zinsser, H.....	150.00
Zinsser, Wm. & Co., Inc.....	250.00

## Stabilizing Naval Stores

Program for stabilizing economic conditions in naval stores by means of private and governmental co-operation was tentatively drafted at meeting between representatives of the industry and members of the U. S. Timber Conservation Board at the Department of Commerce, Nov. 11.

## United States Foreign Trade in Chemicals and Allied Products, January-September

(In thousands of dollars)

Item	Exports		Imports	
	1930	1931	1930	1931
Naval stores, gums and resin.....	17,920	11,195	17,953	10,528
Crude drugs and botanicals.....	1,678	1,437	5,404	4,091
Essential oils.....	1,497	1,079	4,431	2,792
Coal-tar products.....	14,482	8,401	13,310	8,652
Dyes.....	4,645	3,792	3,907	4,351
Medicinal and pharmaceutical preparations.....	13,442	11,557	3,849	3,059
Industrial chemical specialties.....	12,225	11,214		
Industrial chemicals.....	17,971	15,498	17,696	13,291
Pigments, paints, and varnishes.....	17,257	11,931	2,014	1,541
Fertilizers and fertilizer materials.....	12,260	10,396	48,646	37,323
Explosives and fuses.....	2,312	1,402	103	132
Soaps and toilet preparations.....	10,424	8,846	3,605	2,211
Toilet preparations.....	5,846	5,762	2,771	1,629

<sup>1</sup>Not entirely comparable owing to changes in classifications.

# The Financial Markets

**Income Tax Figures—Chemical Stocks and Bonds Decline—American Solvents Bond and Stock Holders Form Committees—American Commercial Changes Par Value—Allied Omits Stock Dividend.**

Corporation returns for 1930, as reported recently by the Treasury Department, indicate more eloquently than any word picture that might be painted how large and important a part the chemical and allied industries play in the industrial life of the country.

## Chemical Gross Income

Of the total number of returns amounting to 90,980, about 8 per cent. were in the chemical and allied division. Of the total number of returns showing the earning of a net income for the year 1930 again about 8 per cent. were of the chemical group. The gross income of all companies reporting a net profit amounted to \$34,397,508, 445, the chemical companies, \$7,990,307, 930, about 23 per cent, of the total. The respective figures for the net income of the total for manufacturing and the chemical division were, \$2,358,967,655 and \$443,073,396—about 18 per cent. This comparison would most certainly seem to indicate very conclusively that the chemical industry is one where gross sales are large, but where the margin of profit is relatively low. It is hardly unlikely that anyone really acquainted with the industry will dispute this conclusion—it is a fact that all are certain of—yet it, is interesting to see this belief so well substantiated.

## Encouraging Figures

These figures, however, do have a very encouraging side to them that is at once apparent. While only 8 per cent of the total number of companies showing net incomes were of the chemical industry, over one-fourth of the gross income of all companies and a little less than one-

fourth of the net income was made by companies in the chemical and allied fields. Of the total income tax of \$269,709,002 received by the Government from manufacturing groups the chemical industry paid \$52,033,118, about 19 per cent of the total. This is an important point that may be driven home if necessary at the present session of Congress. Only the food industry, including beverages and tobacco, and the metals and metal products, out of eleven subdivisions of industrial manufacturing endeavor contributed more in the way of income taxes.

## Losses

In the group of companies whose returns show a net deficit, about 7 per cent of the total number of companies were chemical or allied to the chemical industry. About 8 per cent of the total deficit was reported by companies of the chemical group.

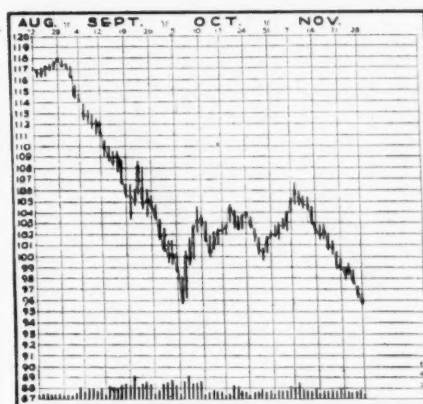
## Stocks React

Months of stock market appreciation seem to be alternating quite regularly with months of depreciation. Net result—zero—in so far as permanent recovery in values is concerned. November belonged quite distinctly to the bear side. Almost without any visible signs of opposition the market drifted through the last three weeks of successively lower prices, canceling October's gains and just missing by a hair's breadth the record low point of early October. Not until the last five hour trading period of November did any substantial rally occur.

The first week witnessed generally advancing prices based on the good news

emanating from the Chicago Wheatpit and other raw commodity trading centers. This improved tone was short-lived, how-

General Market Trend



—N. Y. Herald Tribune

ever, and in the middle of the second week a decided reaction in sentiment turned the market once more into the path of declining values. With no substantial improvements in the domestic situation to point to, and with outcroppings here and there of further bad news from across the waters, East and West, the abortive rise came to an abrupt end.

## 10% Decline in Values

November declines collectively represent an average drop of 10 per cent according to the New York Times. Values of 240 stocks, composing twenty of the main groups, listed on the New York Stock Exchange depreciated \$1,784,140,068 in November, following an appreciation in October of \$1,182,905,560. In November, 1930, same number of issues were down \$781,253,085 from previous month. No group withstood the selling pressure.

## Group Changes

Group changes in value for November, compared with a year ago, follow:

## Corporation Returns for 1930 Classified by Manufacturing Groups

[Income tax returns for calendar year 1930 filed up to Aug. 1931.]

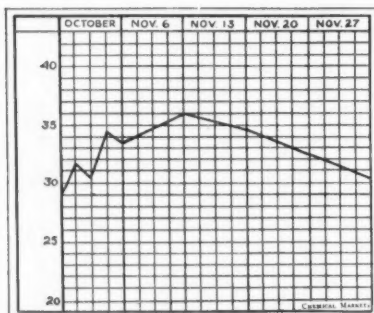
	Total Number of Returns	Returns Showing Net Income				Returns Showing No Net Income—		
		Number	Gross Income	Net Income	Net Loss for Prior Year	Income Tax	Number	Gross Income
Food products.....	14,636	7,836	6,598,636,589	488,951,668	6,174,945	56,186,726	6,211	4,174,197,052
Textiles, textile products.....	13,985	5,401	2,484,552,379	101,588,936	3,638,427	10,633,022	8,332	3,570,069,558
Leather, leather products.....	2,348	857	712,167,811	38,195,919	543,388	4,338,849	1,443	613,320,498
Rubber, related products.....	585	219	556,528,280	11,808,149	778,721	1,285,166	341	347,601,814
Lumber, wood products.....	7,271	2,293	715,007,397	35,578,309	2,007,704	3,572,972	4,699	1,177,354,851
Paper, pulp and products.....	2,026	1,084	954,334,823	72,140,868	1,073,615	8,315,516	899	503,998,144
Printing, publishing.....	11,284	5,916	1,730,995,386	167,268,921	2,389,170	18,795,233	5,030	551,670,381
<b>Chemicals, allied substances.....</b>	<b>6,926</b>	<b>3,106</b>	<b>7,990,307,930</b>	<b>443,073,396</b>	<b>3,740,575</b>	<b>52,033,118</b>	<b>3,488</b>	<b>1,474,962,645</b>
Stone, clay, glass products.....	4,583	1,754	986,075,063	88,302,571	2,439,236	9,962,531	2,634	370,033,229
Metal, metal products.....	19,998	7,929	10,553,209,446	811,163,168	20,318,050	93,345,299	11,364	3,943,808,576
All other mfr. indust.....	7,338	2,785	1,115,693,341	100,895,750	2,658,634	11,240,570	4,014	731,556,573
<b>Total manufacturing.....</b>	<b>90,980</b>	<b>39,180</b>	<b>34,397,508,445</b>	<b>2,358,967,655</b>	<b>45,762,465</b>	<b>269,709,002</b>	<b>48,455</b>	<b>17,458,573,321</b>
								<b>1,430,538,716</b>

	Nov., 1931	Nov., 1930
Amusements.....	\$56,407,123	\$32,513,332
Building.....	13,710,615	13,336,872
Business equipment.....	11,278,200	15,857,024
Chain stores.....	118,219,434	14,622,148
Chemicals.....	67,665,473	620,211
Coppers.....	33,327,501	63,576,013
Dept. stores.....	11,533,622	71,268
Foodst.....	36,135,952	22,713,966
Leathers.....	224,754	770,142
Mail order.....	32,307,916	52,949,442
Motors.....	78,282,325	65,000,615
Motor equipment.....	2,604,295	5,330,563
Oils.....	236,547,887	178,667,291
Public utilities.....	358,715,610	511,388,819
Railroads.....	537,831,305	257,386,804
Railroad equipment.....	35,903,722	28,365,254
Rubber.....	7,552,844	19,780,668
Steels.....	96,668,474	34,012,151
Sugars.....	1,116,122	2,527,110
Tobaccos.....	48,106,894	7,823,688

Based on actions of stocks included in the tabulation, the market declined 10 per cent in November, following 7 per cent rise in October. It has fallen 45 per cent since Jan. 1 and has lost 76 per cent of the values obtaining at the end of September, 1929, or approximately \$35,600,000,000.

### Average Price

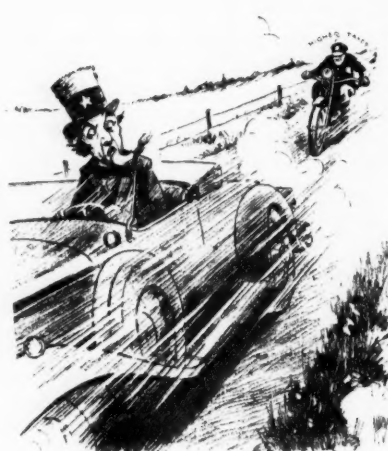
CHEMICAL MARKETS average common stock price for 15 representative chemical companies declined in November, barely missing a new record low level for the



present depression. Each week showed a further decline, the Price Average standing on the four successive Fridays of the month as follows; Nov. 6, 36.05; Nov. 13, 34.91; Nov. 20, 32.23; Nov. 27, 30.41. The record low was recorded in the week of Oct. 2 when the Price stood at 29.79. The following stocks comprise the price; Air Reduction, Allied, Davidson Chemical, Anaconda, Columbian Carbon, Commercial Solvents, Corn Products, Devoe & Reynolds, duPont, Liquid Carbonic, Standard of N. J., U. S. I., Texas Gulf Sulphur, Union Carbide, and Cyanamid.

### Chemical Trend

In the chemical group the trend followed closely that prevailing in the general market. The first half of the month



—N. Y. Times

**"It looks like a Ticket for Me"**

found most of the leading issues at higher levels, but the forward movement could not be sustained in the face of generally adverse conditions. The net losses for the month of November compare as follows with the gains recorded in October.

	November	October
Allied Chemical.....	—18½	+5
Air Reduction.....	—11½	+4½
Anaconda.....	—3½	+18½
Columbian Carbon.....	—16½	+11½
Com. Solvents.....	—2½	+1
Du Pont.....	—8½	—2½
Standard of N. J.....	—4½	+4½
Texas Gulf.....	—4	+5
U. S. I.....	—5½	+9½

In but one or two instances, the net losses in November were much greater than the gains made in the previous month. The oil group held up fairly well due to several items of rather encouraging news but the copper stocks were distinctly in disfavor when the international copper conference broke up in apparent disagreement.

The dollar depreciation of the nine issues comprising the chemical group in the New York Times end of the month survey amounted to \$67,665,473.

Allied Chemical and Dye.....	\$19,510,465
Commercial Solvents Corp.....	3,795,132
Davison Chemical Co.....	19,378,050
Du Pont de Nemours and Co.....	19,364,919
Mathieson Alkali Works.....	1,463,395
Texas Gulf Sulphur.....	2,222,850
Union Carbide & Carbon.....	19,595,479
U. S. Industrial Alcohol.....	1,214,993
Virginia-Carolina Chemical.....	120,190

Total..... \$67,665,473

### 3rd Quarter Earnings

A comparison of third quarter earnings on the common stock of several leading chemical companies with the preceding quarter and with the third quarter of a year ago discloses some interesting comparisons:

	1931 2nd Quarter	3rd Quarter	1930 3rd Quarter
Air Reduc.....	\$1.22 per sh.	\$1.00 per sh.	\$1.53 per sh.
Col. Carbon.....	.55	1.01	.89
Com'l Solv.....	.25	.23	.25
Corn Prod.....	1.05	.64	1.22
Du Pont.....	1.22	1.11	1.05
Hercules Pow.....	.52	.26	.60
Mathieson.....	.51	.53	.69
Monsanto.....	.97	.84	.41
Texas Gulf.....	.76	.91	\$1.32
Union Carbide.....	.50	.53	.80
Westvaco.....	.51	.33	.39

Comparing earnings in the third quarters of 1931 and 1930 respectively, eight companies out of eleven showed reduced earnings and three made better records, Columbian Carbon, Du Pont, and Monsanto. Comparing third quarter earnings in 1931 with the second quarter earnings for the current year, four companies, Columbian Carbon, Mathieson, Texas Gulf, and Union Carbide showed improvement.

### American Solvent's Plans

American Solvents Bond Holders formed a protective committee when American Solvents & Chemical (Delaware), which assumed three issues of debentures, defaulted in payment of interest coupons maturing Sept. 15, last, on American Solvents of Maryland debentures, and on the November 1 interest payment on General Industrial Alcohol debentures. It is expected also that default will be made in payment of interest due Jan. 1, 1932, on Rossville Commercial Alcohol's Twenty-Year Sinking Fund 6% Convertible Debentures.

### Ripley, Chairman

Joseph P. Ripley, Vice-President, National City Co., is committee chairman. Acting on committee are Milton C. Cross, Frederico Lage, Arthur W. Loasby, John Nickerson, Davenport Pogue and Leslie L. Viyian. Members of committee are representative of banking auspices under which various issues of debentures were offered to public. Approximately \$6,650,000 represents three issues of debentures outstanding.

Committee's letter to debenture holders says: "Current operations including the completing of existing forward commitments are resulting in operating losses and are depleting working capital. This situation is the result of a combination of circumstances, including an unusual competitive condition, a substantial overproduction in the industry, a mild winter which reduced the amount of alcohol used as an anti-freeze solution in automobile radiators and the use of synthetic alcohol and substitutes for alcohol in the anti-freeze field, as well as other fields of use. In view of the financial condition of the corporation and the defaults in interest which have taken place and the other default which is anticipated, it is essential that holders of the three issues of debentures unite for their protection."

Holders of American Solvents & Chemical \$3 cumulative convertible preference

### Price Trend of Chemical Company Stocks

Name	Nov. 6	Nov. 13	Nov. 20	Nov. 27	Net change
Allied Chem.....	92½	88½	82½	74½	—18½
Air Reduction.....	66½	64½	59½	55½	—11½
Anaconda.....	17½	16½	14½	14	—3½
Columbian Carbon.....	52½	47½	43½	36	—16½
Comm. Solvents.....	12½	11½	10½	9½	—2½
Du Pont.....	63½	63	58½	55½	—8½
Mathieson Alkali.....	19½	19	17½	16½	—3½
Monsanto Chemical.....	26½	24	23	22½	—4
Standard of N. J.....	36½	35	32½	32½	—4½
Texas Gulf.....	30	28½	27½	26	—4
U. S. I.....	32½	33½	29½	27½	—5½

stock and common stock also formed a protective committee during the month. It is calling for deposits of stock with Bankers Trust Co., before December 15. C. O. Cornell is chairman of the committee which comprises B. W. Jones, H. I. Pepper and F. A. Rogers. Deposit agreement provides that depositors will be allowed to withdraw deposited stock at any time within 30 days after first publication of notice of adoption by committee of any plan of reorganization or readjustment. White & Case are counsel for the committee and H. F. Linder, 50 Broad St., N. Y. City, is Secretary.

### Dividend for Charity

National Lead declared regular dividends of \$1.25 on common, payable Dec. 31 to stock of record Dec. 11, and regular quarterly of \$1.50 on the Class B preferred, payable Feb. 1 to stock of record Jan. 15. In addition to its regular dividend on common, company declared emergency relief dividend of 25 cents a share, which it requested stockholders to contribute to several relief funds.

International Nickel declared dividend of five cents on common, payable Dec. 31, to stock of record Dec. 1. Previously, company paid 10-cent dividend, Sept. 30 and 15 cents in the June and March quarters.

Blaw-Knox declared dividend of 12½ cents, payable Dec. 12 to stock of record Nov. 27. Company paid 25 cents in September and 37½ cents in previous quarters.

Westvaco Chlorine Board of Directors is increased from five to seven by election of C. B. Hibbard, Guaranty Co. and F. D. Everett, Hornblower & Weeks, to the directorate

United Chemicals' Directors declared quarterly dividend of 50 cents per share on \$3 cum. and partic. pref. stock, no par value, payable Dec. 1 to holders of record Nov. 16. From June 1 1929 to Sept. 1 1931 quarterly distributions of 75 cents per share were made on this issue.

### No Stock Dividend

Allied took no action, Nov. 24, on 5% stock dividend. Such dividends were declared at November meetings in both 1930 and 1929. Action on regular cash dividend on common stock is usually taken at December meeting.

Vanadium-Alloys Steel Co. omitted quarterly dividend of 25 cents due at this time.

### Dividends and Dates

	Div.	Stock of Record	Payable
Abbott Labs.....	\$ .62½	Dec. 16	Jan. 2
Allied Chemical & Dye pf.....	1.75	Dec. 11	Jan. 2
Archer Daniels-Midland com.....	.25	Nov. 20	Dec. 1
Atlas Powder com.....	1.00	Nov. 30	Dec. 10
Carman & Co. Inc. Cl. A.....	.50	Nov. 16	Dec. 1
Colgate-Palm-Peet pf.....	1.50	Dec. 10	Jan. 1
Commercial Solvents Devoe & Reynolds com A & B.....	.15	Dec. 21	Jan. 1
Devoe & Reynolds 1st pf.....	1.75	Dec. 21	Jan. 1
Devoe & Reynolds 2nd pf.....	1.75	Dec. 21	Jan. 1
Du Pont de Nemours com.....	1.00	Nov. 25	Dec. 15
Du Pont de Nemours debent.....	1.50	Jan. 9	Jan. 20
Eastman Kodak Co. com.....	1.25	Dec. 5	Jan. 2
Eastman Kodak Co. pf.....	1.50	Dec. 5	Jan. 2
Eastman Kodak Co. com. Ext.....	.75	Dec. 5	Jan. 2
Freeport Texas.....	.75	Nov. 14	Dec. 1
Hercules Powder com.....	.75	Dec. 11	Dec. 24
International Nickel (Canada) com.....	.05	Dec. 1	Dec. 31
International Salt.....	.75	Dec. 15	Jan. 2
Kellogg Spencer & Sons.....	.20	Dec. 15	Dec. 31
Mathieson Alkali Works com.....	.50	Dec. 11	Jan. 2
Mathieson Alkali Works pf.....	1.75	Dec. 11	Jan. 2
National Lead pf A.....	1.75	Nov. 27	Dec. 15
National Lead com.....	1.25	Dec. 11	Dec. 31
National Lead pf B.....	1.50	Jan. 15	Feb. 1
National Lead Co. com. ext.....	.25	Dec. 11	Dec. 31
Penick & Ford Ltd. com.....	.25	Nov. 30	Dec. 14
Penick & Ford Ltd. com ext.....	.50	Nov. 30	Dec. 14
Procter & Gamble 5% pf.....	1.25	Nov. 25	Dec. 15
St. Joseph Lead.....	.25	Dec. 10	Dec. 21
Sherwin Williams pf.....	1.50	Nov. 14	Dec. 1
Sherwin Williams (Can) com.....	.40	Dec. 15	Dec. 31
Sherwin Williams (Can) pf.....	1.75	Dec. 15	Dec. 31
Texas Gulf Sulphur.....	.75	Dec. 1	Dec. 15
United Chemical Corp. pf.....	.50	Nov. 16	Dec. 1
Westvaco Chlorine Prod. com.....	.40	Nov. 16	Dec. 1

### Consolidated Buys Eagle-Picher?

Consolidated Lead called special stockholders' meeting for Dec. 11, to vote on details proposed merger, with subsidiary of Eagle-Picher Lead. It is proposed to sell all assets of Consolidated Lead, with exception of cash item amounting to \$48,500, to Eagle-Picher Mining in exchange for 80,000 shares of Eagle-Picher capital stock. In event extension of valuable lease held by Consolidated be allowed, further 20,000 shares will be given. Lease expires in near future.



### Now Directors

L. F. Nickell, right, and G. Lee Camp, left, elected directors Monsanto Chemical, succeeding James H. Becker and Howell W. Murray, resigned



### Over the Counter Prices\*

	Bid	Asked
J. T. Baker Chem.....	10	14
Dixon Crucible.....	95	105
Merek pf.....	60	65
Petroleum Derivatives.....	5	8
Solid Carbonic, Ltd.....	3¼	4¾
Tubize B.....	37	42
Worcester Salt.....	86	91
Young, J. S. Co., com.....	87	93
Young, J. S. Co., pf.....	100	..

\*Close Nov. 30.

### Change of Stock Par

American Commercial Alcohol changes par, stockholders, Nov. 24 approved plan to reduce capital represented by issued common stock from \$8,769,697 to \$3,894,950 and to change authorized common stock from 750,000 shares of no par value into the same number of shares, par \$10 each.

Stockholders also authorized directors to transfer \$4,874,747, amount by which capital had been reduced, to surplus account, and further authorized board to set up reserves out of the surplus thus created to write off losses resulting from operations, depreciation and obsolescence of property and decline in value of inventories.

### Brown's Extra

Brown Linseed directors declared extra dividend of 12½ cents per share in addition to regular quarterly dividend of 25 cents per share on common stock, both payable Dec. 1.

### Viewing Two Sides

Net income of 11 of the leading companies of the industry for the third quarter was 29% below the total figure for 1930. For the nine months period the net income of the same companies was off 33% from last year. These figures are decidedly favorable when comparison is made with the general industrial average where earnings are estimated by the National Securities Analysis to have declined over 50%.

### Initial Payment

Chemical Research Corp., declared initial distribution of 10 cents per share payable Dec. 14 to holders of record Dec. 10.

## Earnings at a Glance

Company	Annual Dividends	Net Income 1931	Net Income 1930	Common Share Earnings 1931	Common Share Earnings 1930
American Commercial Alcohol:					
Sept. 30 quarter.....	f...	\$19,886	\$105,745	.....	.....
9 mos., Sept. 30.....	f...	\$262,827	70,186	.....	.18
California Ink:					
Year, Sept. 30.....	c2.00	267,503	269,416	c2.46	c2.48
Carman & Co.:					
Sept. 30 quarter.....	m...	51,277	.....	.42	.....
9 mos., Sept. 30.....	m...	159,757	.....	1.34	.....
New Jersey Zinc:					
Sept. 30 quarter.....	2.00	778,817	1,050,880	.39	.53
9 mos., Sept. 30.....	2.00	2,504,838	4,140,036	1.27	2.11
United Carbon Co.:					
Sept. 30 quarter.....	f...	\$39,741	208,214	.....	.43
9 mos., Sept. 30.....	f...	\$74,029	676,443	.....	1.42
United Chemicals:					
9 mos., Sept. 30.....	f...	259,823	382,410	.....	.....
Sherwin-Williams of Canada, Ltd.:					
Year, Aug. 31.....	1.60	158,950	632,152	p4.59	1.95

†Net loss. cOn combined Class A and Class B shares. fNo common dividend.



"It is time, in this industrial age, that there be added to the recognized fixed charges of interest on borrowed capital, rents, taxes, insurance, depreciation, and obsolescence, an equally fixed charge for an adequate and sustained program of research." Bakelite Vice-President Redman receives Grasselli Medal.

### Chemical Stock Values

The following table, from the Wall St. Journal, shows on the first day of each month—average price a share for chemical stocks—market value—number of issues listed and the total number of shares listed on the New York Stock Exchange. (The average price is found by dividing the total number of shares listed into their total market value, without adjustment for split-ups, stock dividends, etc.) Some indication of the severity in decline may be gleaned from the table.

1931	Average Price	Market Value	Issues Listed	Shares Listed
Nov.....	\$38.55	\$2,602,258,106	78	67,502,567
Oct.....	36.51	2,449,805,531	78	67,108,508
Sept.....	51.70	3,472,840,379	78	67,172,269
Aug.....	51.14	3,428,303,042	78	67,034,638
July.....	54.14	3,628,804,305	78	67,022,938
June.....	47.51	3,184,157,104	78	67,022,938
May.....	54.52	3,607,965,743	77	66,179,702
April.....	60.27	3,983,390,995	77	66,092,982
Mar.....	65.01	4,262,339,457	77	65,560,742
Feb.....	59.00	3,838,143,077	79	65,056,132
Jan.....	57.44	3,740,863,710	80	65,125,800
1930				
Dec.....	61.70	\$3,993,018,769	79	64,714,750
Nov.....	62.12	4,016,741,086	79	64,659,806
Oct.....	69.18	4,472,728,582	77	64,656,555
Sept.....	78.60	5,097,853,802	79	64,856,055
Aug.....	76.09	4,933,061,625	79	64,832,348

July.....	72.49	4,668,596,554	79	64,406,242
June.....	86.73	5,628,343,002	82	64,898,278
May.....	88.06	5,692,764,168	80	64,647,316
April.....	90.70	5,856,519,877	80	64,567,925
Mar.....	84.10	5,267,227,975	77	62,630,165
Feb.....	82.98	5,145,270,121	74	62,006,959
Jan.....	75.99	4,697,423,478	74	61,814,294
1929				
Dec.....	74.13	\$4,579,159,767	74	61,776,030
Nov.....	89.15	5,370,065,421	72	60,237,774
Oct.....	117.92	6,705,883,229	72	56,868,668
Sept.....	125.64	7,112,152,781	72	56,606,178
Aug.....	124.16	5,983,824,039	69	48,195,106
July.....	119.27	5,503,566,964	64	46,145,189
June.....	105.08	4,825,454,669	64	45,920,839
May.....	128.77	5,042,860,361	62	39,160,745
April.....	123.83	4,807,895,966	64	38,826,771
Mar.....	132.78	5,092,065,345	64	38,349,214
Feb.....	167.22	5,067,577,072	63	30,304,408
Jan.....	150.66	4,437,714,037	65	29,455,622

### Standard Recalls Debentures

Standard Oil of New Jersey calls for retirement on Feb. 1, \$30,000,000 of its five per cent twenty-year debentures, Walter C. Teagle, president, announced Nov. 23. These bonds are a part of \$120,000,000 brought out Dec. 15, 1926, in company's program for retiring \$200,000,000 of preferred stock then outstanding. Bonds, not due until Dec. 15, 1946, will be drawn by lot and under terms of issue will be redeemed at 102%.

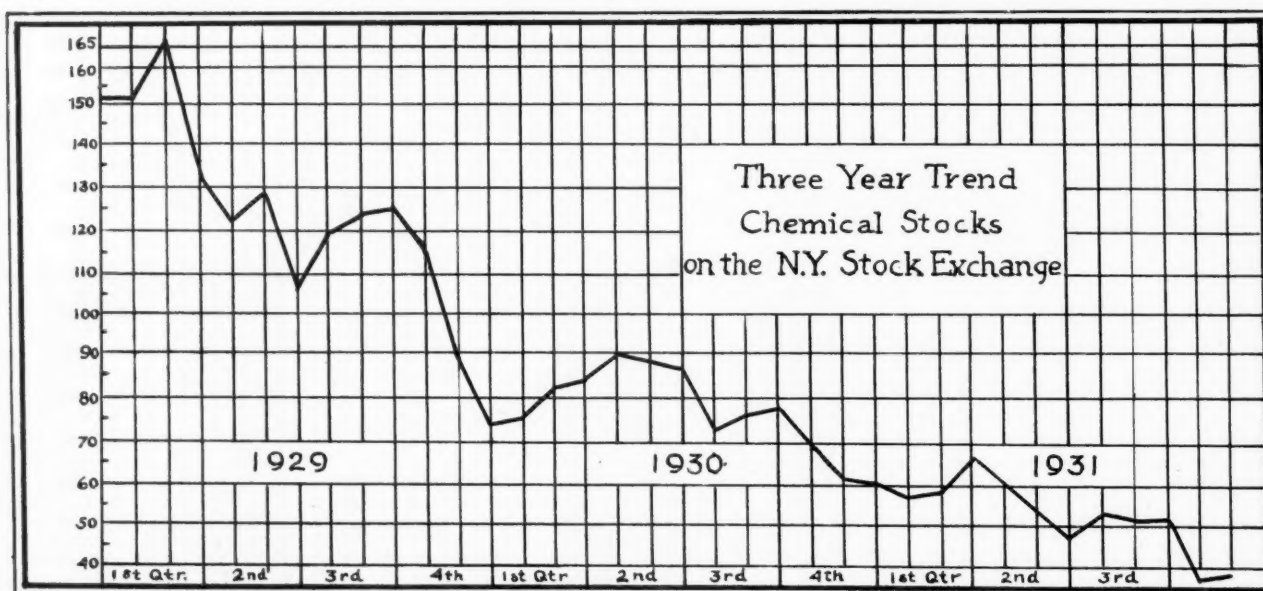
Mr. Teagle explained that as one-quarter of term for which debentures were issued was about to expire, it seemed wise to reduce funded indebtedness in that proportion. The \$30,600,000 needed for retirement is on hand in the form of cash, which item is understood to be larger now than at the beginning of the year because of reduction in inventories.

### I. G. Earnings Off

I. G. reported company's 1931 profits considerably below last year, consequently a dividend reduction is necessary. Bankers expect dividend of from 6% to 8% compared with 12% last year.

Although company has no short term debts, and its color and drug business has been good, a large decrease in its home and nitrate sales affected profits adversely.

F. D. Everett and C. B. Hibbard elected, October 29, members Westvaco Board of Directors.



Is liquidation about ended in chemical stock values after seven "waves" of lower prices?



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from tuberculosis

**Buy**

**CHRISTMAS SEALS**

THE NATIONAL, STATE AND LOCAL TUBERCULOSIS ASSOCIATIONS OF THE UNITED STATES

---

## Company Reports

### United Carbon Reports Loss

United Carbon and subsidiaries report for quarter ended September 30, 1931, net loss of \$39,741 after depreciation, depletion, etc., comparing with net loss of \$56,546 in preceding quarter and net profit of \$208,214, equal, after dividend requirements on 7% preferred stock, to 43 cents a share on 397,885 no-par shares of common stock in third quarter of previous year.

For nine months ended September 30, 1931, net loss was \$74,029 after charges. This compares with net profit of \$676,443, equal, under, the participating provisions of the shares, to \$5.71 a share on 18,978 shares of participating preferred and \$1.42 a share on 397,885 common shares in first nine months of 1930.

Consolidated balance sheet as of September 30, 1931, shows current assets, including \$598,474 cash, of \$3,883,135 against current liabilities of \$996,495.

Period	1931—3 Mos.—1930	1931—9 Mos.—1930
Oper. profit after deduct. mg., selling, gen. and administrative exps.	\$106,989	\$423,511
From sale of property	Dr. 3,272	168,075
Total income	\$103,717	\$591,586
Deprec. & depletion	143,459	368,372
Provis'n for contingenc's	5,000	75,000
Prov. for Fed. inc. tax	10,000	65,000
Net profit	loss \$39,741	\$208,214
Preferred dividends		70,988
Common dividends		198,942
Balance, surplus	loss \$39,741	\$9,272
Shs. com. stk. out. (no par)	397,885	397,885
Earnings per share	Nil	\$0.43

### Favorable Columbian Carbon Quarter

Columbian Carbon and subsidiaries report for nine months ended September 30, 1931, net income of \$1,406,015 after taxes, depreciation, depletion and minority interests, equivalent to \$2.61 a share on 538,420 no-par shares of stock. This compares with \$2,038,455 or \$4.09 a share on 498,505 shares in the first nine months of 1930.

Net income for quarter ended September 30, 1931, amounted to \$546,283 after charges and taxes, equal to \$1.01 a share on 538,420 shares comparing with \$299,231 or 55 cents a share on 537,745 shares in preceding quarter and \$445,274 or 89 cents a share on 498,505 shares in third quarter of preceding year.

Period End. Sept. 30	1931—3 Mos.—1930	1931—9 Mos.—1930
Net after Federal tax	\$916,241	\$873,344
Deprec. & depletion	361,355	390,976
Apply to minority int.	8,603	37,094
Net income	\$546,283	\$445,274
Dividends	670,267	747,757
Surplus	df. \$123,984	df. \$302,483
Com. shs. outstanding	538,420	498,505
Earnings per share	\$1.01	\$0.89

United States Gypsum Co. and subsidiaries report for six months ended June 30, 1931, net income of \$2,241,560 after depreciation, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to \$1.62 a share (par \$20) on 1,216,956 shares of common stock. This compares with \$2,891,750, or \$2.24 a share on 1,170,370 common shares in first half of 1930.

Consolidated income account for six months ended June 30, 1931, compares as follows:

	1931	1930
Operating profit	\$3,448,596	\$4,151,734
Other income	397,867	287,589
Total income	\$3,846,463	\$4,439,323
Depreciation & depletion	1,126,681	1,055,153
Miscellaneous deductions	174,965	96,219
Income taxes	303,257	396,201
Net income	\$2,241,560	\$2,891,750
Preferred dividends	274,459	269,209
Common dividends	973,267	928,709
Surplus	\$993,834	\$1,693,832

### United Chemical Nine Months' Net

United Chemicals, and subsidiaries report for nine months ended September 30, 1931, consolidated net profit of \$259,823, which after provision for dividends on preferred stock, leaves available for preferred stock participation and common stock \$1,411. This compares with net profit of \$382,410 for same period of 1930, which after provision for preferred dividends, left available \$123,323 for preferred stock participation and common stock.

Current assets as of September 30, amounted to \$3,096,927 and current liabilities \$171,670 comparing with \$3,742,117 and \$229,429 respectively at end of September last year.

9 Months Ended Sept. 30—	1931	1930
Consolidated net profit	\$259,823	\$382,410
Preferred dividends	258,412	259,077
Balance	\$1,411	\$123,323

### Consolidated Chemical Nets \$112,591

Consolidated Chemical Industries, reports for nine months ended September 30, 1931, net profit of \$351,135 after depreciation, federal taxes, etc., equivalent to \$1.23 a share on the combined 285,000 no-par shares of Class A and Class B stocks. This compares with \$512,862, or \$1.80 a share, on the combined shares in first nine months of previous year.

For quarter ended September 30, 1931, net profit was \$112,591 after charges and federal taxes, equal to 40 cents a share on combined stocks against \$199,521, or 70 cents a share, on combined stocks in third quarter of 1930.

Applied directly to the Class A stock, net profit for first nine months of 1931 is equal to \$1.71 a share on 205,000 shares against \$2.50 a share in first nine months of 1930, while the third quarter net is equal to 55 cents against 97 cents in third quarter of 1930.

### Manville Earns \$1.08 a Share

Johns-Manville and subsidiaries report for quarter ended September 30, 1931, net profit of \$261,406 after depreciation, depletion, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to 17 cents a share on 750,000 no-par shares of common stock. This compares with \$715,657 or 78 cents a share in preceding quarter and \$1,202,867 or \$1.43 a common share in third quarter of previous year.

Net profit for nine months ended September 30, 1931, was \$1,207,174 after charges and taxes, equal to \$1.08 a share on common, comparing with \$2,943,027 or \$3.40 a common share in first nine months of 1930.

Consolidated income account for quarter ended September 30, 1931, compares as follows:

	1931	1930	1929	1928
Sales	\$8,433,091	\$12,581,619	\$17,184,461	\$12,531,502
Exp. depr. et.	8,132,974	11,223,356	14,411,931	10,616,709
Balance	\$300,177	\$1,358,263	\$2,772,530	\$1,914,793
Federal taxes	38,711	155,396	289,230	192,342
Net profit	\$261,406	\$1,202,867	\$2,483,300	\$1,722,451
Nine months ended September 30:				
Sales	\$25,863,353	\$38,143,538	\$46,776,102	\$34,875,232
Exp. depr. et.	24,511,649	34,827,342	40,587,315	30,312,352
Balance	\$1,351,704	\$3,316,196	\$6,188,787	\$4,562,880
Federal taxes	144,530	373,169	666,391	467,285
Net profit	\$1,207,174	\$2,943,027	\$5,522,396	\$4,095,595

### S.-W. (Can) Profit \$158,951

Sherwin-Williams of Canada net profit for year ended August 31, 1931, was \$158,951 after depreciation, interest, income taxes, inventory write-offs and \$92,917 write-off of investments. In preceding fiscal year company reported net profit of \$632,152 after depreciation, interests, federal taxes and pension fund.

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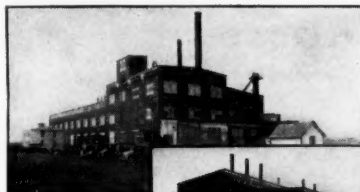
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CLEVELAND, OHIO.

# The Industry's Stocks

1931						Sales		ISSUES	Par \$	Shares Listed	An. Rate	Earnings		
Nov.	1931		1930		In Nov.	During 1931	\$-per share-3					1929		
Last	High	Low	High	Low	Nov.		1930							
NEW YORK STOCK EXCHANGE														
56	69	53	109	52	156	87	65,200	1,409,300	Air Reduction.....	No	830,000	\$3.00	6.32	7.75
77	98	73	182	68	343	170	610,000	3,231,985	Allied Chem. & Dye.....	No	2,401,000	6.00	9.77	12.60
118	120	118	133	120	126	120	1,400	17,300	7% cum. pfd.....	100	393,000	7.00		76.88
7	10	7	29	5	10	1	10,400	86,300	Amer. Agric. Chem.....	100	333,000		Yr. Je. '30	Nil
7	10	7	14	5	33	9	76,400	325,400	Amer. Com. Ale.....	No	389,000		d1.27	3.22
6	10	6	23	5	51	7	40,500	198,500	Amer. Metal Co., Ltd.....	No	1,218,000	1.00	1.63	3.23
28	41	21	89	30	116	80	1,320	3,040	conv. 6% cum. pfd.....	100	68,000	6.00		47.53
23	36	22	58	19	79	37	231,100	1,199,745	Amer. Smelt. & Refin.....	No	1,830,000	4.00	3.77	10.02
100	104	99	138	98	141	131	1,200	19,800	7% cum. pfd.....	100	500,000	7.00		43.66
3	5	3	4	2	22	2	27,900	160,200	Amer. Solvents & Chem.....	No	503,000		d2.86	2.56
14	19	13	43	12	79	26	6,900	47,800	Amer. Zinc Lead, & Smelt.....	25	200,000		d1.46	0.53
13	15	12	18	8	29	13	1,400	7,300	6% cum. pfd.....	25	80,000			7.32
11	15	10	23	8	51	16	384,530	5,383,403	Anaconda Copper Mining.....	50	8,859,000	2.50	e2.07	8.29
26	37	22	54	20	106	42	61,975	111,900	Archer Dan. Midland.....	No	550,000	2.00	Yr. Aug. '30	1.68
77	88	77	99	77	106	97	5,500	48,200	Atlantic Refining Co.....	25	2,690,000	1.00	1.02	6.20
3	4	3	7	2	15	2	350	4,710	Atlas Powder Co.....	No	265,000	4.00	2.67	7.66
1	2	1	2	1	4	1	2,600	28,000	6% cum. pfd.....	100	96,000	6.00		28.25
3	4	3	7	2	15	2	11,654	52,054	Butte & Sup. Mining.....	10	290,000		Nil	0.34
25	26	25	25	8	45	6	2,700	300	Butte Copper & Zinc.....	5	600,000			0.34
30	35	29	50	28	64	44	12,800	82,700	Certain-Feed Products.....	No	400,000		d7.61	Nil
39	56	34	111	33	199	65	96,655	801,375	7% cum. pfd.....	100	63,000			Nil
10	13	9	21	9	38	14	171,400	2,654,100	Colgate-Palmolive-Peet.....	No	2,000,000	2.50		3.76
48	58	43	86	36	111	65	88,900	854,350	Columbian Carbon.....	No	499,000	5.00	5.04	7.84
129	132	129	152	129	151	140	190	8,720	Comm. Solvents.....	No	2,530,000	1.00	1.07	1.51
5	8	5	23	4	43	10	11,800	336,700	Corn Products.....	25	2,530,000	3.00	4.82	5.49
12	12	12	19	11	42	11	5,500	29,700	7% cum. pfd.....	100	250,000	7.00		62.59
106	106	106	109	100	114	99	40	740	Devon Chem. Co.....	No	504,000		Yr. Je. '30	4.00
57	69	54	107	53	145	80	623,300	5,105,100	Devco & Reynolds "A".....	No	160,000	1.20	2.24	4.52
104	108	104	124	104	123	114	6,400	47,420	7% cum. 1st pfd.....	100	16,000	7.00		67.59
96	117	91	185	91	255	142	129,950	1,622,819	DuPont de Nemours.....	20	11,014,000	4.00	4.52	6.99
125	125	123	135	123	134	120	50	2,680	6% cum. deb.....	100	978,000	6.00		78.54
17	23	16	43	13	55	24	53,000	960,300	Eastman Kodak.....	No	2,261,000	5.00	8.84	9.57
14	18	14	47	9	71	22	33,200	683,400	6% cum. pfd.....	100	62,000	6.00		356.89
7	9	7	16	4	38	7	11,100	228,371	Freeport Texas Co.....	No	730,000	4.00	w4.77	5.60
68	73	58	80	60	105	63	1,020	9,270	General Asphalt Co.....	No	413,000	3.00	2.44	4.71
32	37	32	58	32	85	50	700	15,600	Glidden Co.....	No	695,000		Yr. Oct. '30	Nil
100	104	100	119	100	123	116	490	6,170	7% cum. prior pref.....	100	74,000	7.00	Yr. Oct. '30	Nil
29	35	26	86	21	124	31	13,625	389,225	Hercules Powder Co.....	No	603,000	3.00	2.61	5.95
1	2	1	5	1	8	3	6,700	48,000	7% cum. pfd.....	100	114,000	7.00		38.16
9	13	9	51	10	67	42	1,750	19,950	Industrial Rayon.....	No	200,000	4.00	7.74	7.26
29	36	28	42	25	45	31	658,200	6,479,924	Intern. Agric.....	No	450,000		Yr. Je. '30	1.68
26	36	25	80	25	148	48	30,700	420,700	7% cum. prior pfd.....	100	100,000	7.00	Yr. Je. '30	14.58
12	14	12	16	9	25	8	96,350	2,816,825	Intern. Nickel.....	No	14,584,000	1.00	.67	1.47
20	23	18	55	15	81	39	1,500	16,300	Intern. Salt.....	No	240,000	3.00		11.32
25	27	25	37	20	49	25	10,000	244,500	Johns-Manville Corp.....	No	750,000	3.00	3.66	8.09
8	8	5	17	5	37	10	26,200	349,300	Kellogg (Spencer).....	No	598,000	0.80	h1.14	2.36
25	27	25	37	20	49	25	2,200	46,027	Liquid Carbonic Corp.....	No	342,000	4.00	Yr. Sep. '30	5.22
15	15	15	25	15	39	20	700	14,500	McKesson & Robbins.....	No	1,073,000	1.00	.96	2.65
16	29	16	31	14	51	30	14,025	428,090	conv. 7% cum. pref.....	50	428,180	3.50		9.43
114	114	109	125	108	136	115	40	940	MacAndrews & Forbes.....	No	340,000	2.60	2.61	3.13
23	27	22	29	16	63	18	8,500	84,400	Mathieson Alkali.....	No	650,000	2.00	2.96	3.31
20	24	20	36	19	39	18	12,000	352,200	7% cum. pfd.....	100	28,000	7.00		93.91
91	101	91	132	84	189	114	800	74,800	Monsanto Chem.....	No	416,000	1.25	1.71	4.25
130	131	130	143	130	144	135	960	10,260	National Dist. Prod.....	No	252,000	2.00	1.23	1.42
104	104	104	120	102	120	116	200	6,610	National Lead.....	100	310,000	5.00	7.58	25.49
25	33	25	46	22	55	26	12,200	333,400	7% cum. "A" pfd.....	100	244,000	7.00		41.95
43	49	41	71	39	78	52	54,800	465,800	6% cum. "B" pfd.....	100	103,000	6.00		82.47
5	7	5	11	5	27	7	30,900	529,000	Penick & Ford.....	No	425,000	1.00	4.01	3.97
70	80	70	101	65	114	90	210	10,510	Procter & Gamble.....	No	6,410,000	2.40	Yr. Je. '30	3.36
16	19	15	42	13	56	36	31,000	397,800	Pure Oil Co.....	25	3,038,000		.18	1.52
12	16	11	30	9	57	19	29,100	358,640	8% cum. pfd.....	100	130,000	8.00		22.55
4	5	4	10	3	25	5	65,500	918,390	Royal Dutch, N. Y. shs.....	10	894,000		2.39	3.35
31	36	30	51	28	75	42	174,264	1,421,674	St. Joseph Lead.....	No	1,951,000	2.00	2.09	3.82
32	37	31	52	28	84	43	317,500	4,138,425	Shell Union Oil.....	No	13,071,000		d.56	1.26
12	15	11	26	11	40	19	175,525	2,580,680	Standard Oil, Calif.....	No	12,846,000	2.50	2.88	3.63
3	3	3	9	2	17	7	6,600	87,000	Standard Oil, N. J.....	25	25,419,000	1.00	1.65	4.76
17	21	16	36	15	60	28	143,600	1,930,800	Standard Oil, N. Y.*.....	25	17,809,000	1.60	.92	2.23
27	31	25	55	20	67	40	69,800	1,727,950	Tenn. Corporation.....	No	857,000	1.00	1.21	2.19
34	40	32	72	27	106	52	267,116	4,119,191	Texas Corp.....	25	9,851,000	3.00	1.53	4.91
13	18	12	28	6	84	14	15,600	496,300	Texas Gulf Sulphur.....	No	2,540,000	4.00	5.50	6.40
29	36	27	77	20	139	50	241,100	1,214,216	Union Carbide & Carb.....	No	9,001,000	2.60	3.12	3.94
16	23	15	76	13	143	44	138,400	7,981,750	United Carbon Co.....	No	398,000		1.43	1.94
3	5	3	17	3	34	9	4,500	34,800	U. S. Ind. Alc. Co.....	No	374,000	6.00	2.96	12.63
45	50	45	72	45	82	67	910	24,560	Vanadium Corp. of Amer.....	No	378,000	3.00	2.95	4.91
10	15	10	40	8	59	18	800	14,100	Virginia Caro. Chem.....	No	487,000		Yr. Je. '30	Nil
							13,100	165,150	6% cum. part. pfd.....	100	213,000		Yr. Je. '30	2.63
									7% cum. prior pfd.....	100	145,000	7.00	Yr. Je. '30	11.96
									Westvaco Chlorine Prod.....	No		2.00	2.51	4.32

h 11 mos. ending Aug. 30

w 13 mos.

z Before inventory adjustment

\* Socony Vacuum

## NEW YORK CURB

6	6	6	8	5	13	3	300	6,800	Acetol Prod. conv. "A".....	No	60,000			0.42
67	92	66	224	66	34	16	500	87,425	Agfa Ansco Corp.....	No	300,000			Nil
75	82	75	109	75	111	104	24,450	242,493	Aluminum Amer.....	No	1,473,000		z1.93	11.18
4	6	4	12	3	37	6	3,300	33,500	6% cum. pfd.....	100	1,473,000	6.00		17.19
2	2	2	4	1	43	7	40,250	675,422	Amer. Cyanamid "B".....	No	2,404,000			4.15
							23,000	99,700	Anglo-Chilean Nitrate.....	No	1,757,000		Yr. Je. '30	Nil
							200	25,406	Assoc. Rayon Corp.....	No	1,200,000		Yr. Je. '30	1.87
								47,300	conv. 6% cum. pfd.....	100	200,000	6.00		

\*New low for year



*A* Comparatively new customer recognizes a well-known characteristic of Mallinckrodt Service

## Secure Packing

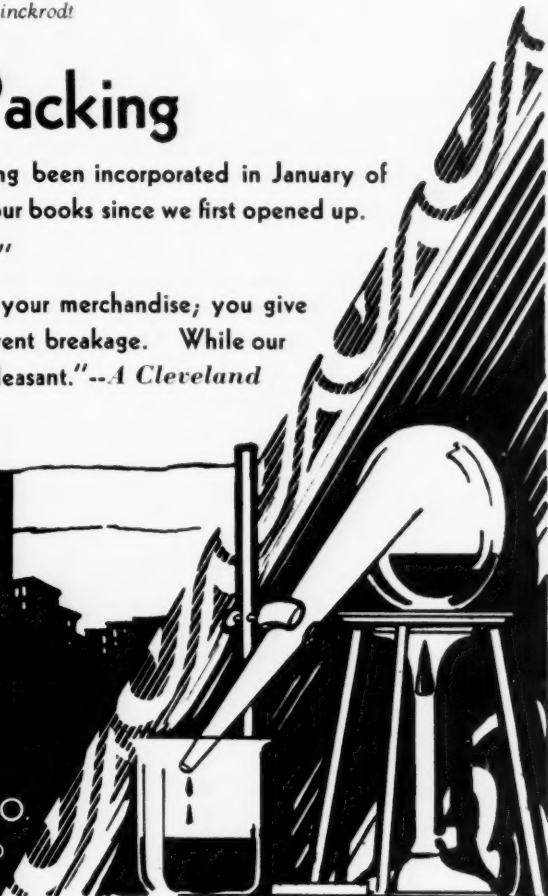
"Ours is a comparatively new concern, having been incorporated in January of 1928. I believe our name has been on your books since we first opened up.

"What has kept us patronizing you since that time?"

"We have never had a complaint from our customers on your merchandise; you give us good service; and your goods are so packed as to prevent breakage. While our purchases have been small, our relations have been most pleasant."--A Cleveland Supply House.

### Mallinckrodt Chemical Works

*Manufacturers of Fine Chemicals for Medicinal, Analytical, Photographic and Industrial use. Separate catalogs are available on each line. Copies on request.*



As manufacturers of raw material from our own mines, in our own by-product coke and tar distilling operations, we are in excellent position to insure to the chemical consuming industry, including dyestuff, pharmaceutical and resin manufacturers, their basic



## REFINED COAL TAR PRODUCTS

which are PURE, UNIFORM, RELIABLE, STANDARDIZED and remarkably free from impurities, with excellent color and odor. Plants favorably situated to insure prompt delivery. Samples and technical information gladly furnished upon request.

BENZOL (all grades)  
PHENOL (80% and 90% Purity)  
TOLUOL (Industrial and Nitration)  
CRESOL (U. S. P., Resin and special fractions)  
XYLOL (10° and Industrial)  
CRESYLIC ACID (99% Pale — Low boiling)  
SOLVENT NAPHTHA  
XYLENOLS

### KOPPERS PRODUCTS COMPANY

Providence PITTSBURGH Chicago  
Birmingham  
274 Brannan Street --- San Francisco

1931 Nov. Last	High	Low	1931 High	Low	1930 High	Low	In Nov.	Sales During 1931	ISSUES	Par \$	Shares Listed	An. Rate	Earnings \$-per share-\$ 1930	1929
2 1/2	2 1/2	1 1/2	2 1/2	1 1/2	5 1/2	1 1/2	5,600	29,500	Brit. Celanese Am. Rets. ....	2.43	2,806,000			0.03
49 1/2	49 1/2	36	81 1/2	36*	90	48	150	2,900	7% cum. part. 1st pfd. ....	100	148,000	7.00		14.50
25	25	25	65	25*	90	70	230	5,590	7% cum. prior pfd. ....	100	115,000	7.00		25.70
2	2	2	7	2	20	3 1/2	300	6,740	Celluloid Corp. ....	No	195,000			1.76
7 1/2	7 1/2	7 1/2	9	6 1/2	13 1/2	8 1/2	200	8,340	Courtaulds, Ltd. ....	1 1/2				4.04
36	38	35	51	34	100	49	2,250	7,750	Dow Chemical. ....	No	630,000	2.00	3.44	3.08
45	57 1/2	44 1/2	75 1/2	38	166 1/2	58 1/2	30,000	327,900	Gulf Oil. ....	25	4,525,000	1.50		9.83
8	8	8	13	8 1/2	23	10 1/2	200	4,800	Heyden Chemical Corp. ....	1 1/2	150,000			0.49
			3 1/2	3	7	4		3,700	Imperial Chem. Ind. ....	No	128,000			2.54
			60	20	79 1/2	45		12,300	Monroe Chem. ....	No	2,178,000	2.50		2.35
41 1/2	46 1/2	41 1/2	66 1/2	41 1/2	85	58	600	8,300	Sherwin-Williams Co. ....	25	636,000	4.00	Yr. Aug. '30 4.14	
2 1/2	3 1/2	2 1/2	12	2	34 1/2	3 1/2	1,400	44,200	Silica Gel Corp. ....	No	600,000			
18 1/2	23 1/2	18 1/2	38 1/2	15 1/2	59 1/2	30	105,700	638,300	Standard Oil Ind. ....	25	16,851,000	2.50	2.73	4.66
22	23 1/2	22	30 1/2	20 1/2	34 1/2	27	8,000	95,700	Swift & Co. ....	25	6,000,000	2.00	2.08	2.18
3	3 1/2	2 1/2	16	2 1/2	22 1/2	3	5,700	166,450	Tubize "B" ....	No	600,000	10.00		
10 1/2	15 1/2	10 1/2			44	14	300	23,100	United Chemicals. ....	No	115,000	3.00		7.66
									\$3 cum. part. pfd. ....	No				

#### CLEVELAND

55	55	55	94	55	96	91 1/2	50		Cleve-Cliffs Iron, \$5 pfd. ....	No	498,000	5.00	11.42	
38 1/2	39	32 1/2	51 1/2	30	100	48	850		Dow Chemical Co. ....	No	630,000	2.00	3.44	4.08
44	47 1/2	44	68 1/2	44*	85	57 1/2	2,585	23,649	Sherwin-Williams Co. ....	25	636,000	4.00	Yr. Aug. '30 4.14	

#### CHICAGO

32 1/2	32 1/2	32	39 1/2	28	46 1/2	33 1/2	850	14,200	Abbott Labs. ....	No	145,000	2.50	3.32	4.92
4	4	4	5 1/2	3	15	3 1/2	60	720	Monroe Chem. ....	No	126,000		1.09	2.54
26	26	26	33	24	35	15 1/2	120	3,500	\$3.50 cum. pref. ....	No	30,000	3.50		13.35
23	23 1/2	22 1/2	30 1/2	20 1/2	33 1/2	27	17,950	152,200	Swift & Co. ....	25	6,000,000	2.00	2.08	2.18

#### CINCINNATI

43 1/2	49 1/2	43	71	39 1/2	110	53 1/2	6,456	89,865	Procter & Gamble. ....	No	6,410,000	2.40	Yr. Je. '30 3.36	
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#### PHILADELPHIA

50	50	50	71	50*	100	89	100	3,215	Pennsylvania Salt. ....	50	150,000	5.00	Yr. Je. '30 7.97	
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## The Industry's Bonds

1931 Nov. Last	High	Low	1931 High	Low	1930 High	Low	In Nov.	Sales During 1931	ISSUE	Date Due	Int. %	Int. Period	Out- standing \$
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#### NEW YORK STOCK EXCHANGE

82	88	82	99	81 1/2	100 1/2	93	20	306	Amer. Cyan. deb. 5s. ....	1942	5	A. O.	4,554,000
73	81 1/2	73	102	60	177	94 1/2	261	4,829	Amer. I. G. Chem. conv. 5 1/2s. ....	1949	5 1/2	M. N.	29,933,000
99 1/2	100	97 1/2	104 1/2	96	104	101	481	4,269	Am. Smelt & Ref. 1st. 5s. "A" ....	1947	5	A. O.	36,578,000
14	25 1/2	14	63 1/2	14*	98 1/2	67	57	953	Anglo-Chilean s. f. deb. 7s. ....	1945	7	M. N.	14,600,000
96 1/2	97 1/2	96 1/2	103	96 1/2*	103	100	61	1,470	Atlantic Refin. deb. 5s. ....	1937	5	J. J.	14,000,000
68	68	68	104	68*	105 1/2	100 1/2	5	578	Interlake Iron Corp. 1st 5 1/2s "A" ....	1945	5 1/2	M. N.	6,629,000
102 1/2	102 1/2	102	105 1/2	100	104 1/2	97 1/2	12	163	Corn Prod. Refin. 1st s. f. 5s. ....	1934	5	M. N.	1,822,000
11 1/2	18 1/2	11 1/2	75 1/2	6	87 1/2	38	372	5,533	Lautaro Nitrate conv. 6s. ....	1954	6	J. J.	32,000,000
82	87 1/2	82	96	72	100 1/2	87	73	1,565	Pure Oil s. f. 5 1/2% notes ....	1937	5 1/2	F. A.	17,500,000
89 1/2	91 1/2	89 1/2	103	88	104	93 1/2	57	918	Solvay Am. Invest. 5% notes ....	1942	5	M. S.	15,000,000
101 1/2	102 1/2	101	105 1/2	101	104 1/2	100	764	8,386	Standard Oil, N. J. deb. 5s. ....	1946	5	F. A.	120,000,000
94 1/2	97 1/2	94 1/2	106 1/2	94 1/2*	104 1/2	96 1/2	251	5,265	Standard Oil, N. Y. deb. 4 1/2s. ....	1951	4 1/2	J. D.	50,000,000
69	75	68 1/2	99	63	102 1/2	90 1/2	190	1,652	Tenn. Corporation deb. 6s. "B" ....	1944	6	M. S.	3,308,000

#### NEW YORK CURB

99 1/2	100 1/2	99	105 1/2	100 1/2	104 1/2	100 1/2	262,000	2,749,000	Aluminum Co., s. f. deb. 5s. ....	1952	5	M. S.	37,115,000
76	78	75	104 1/2	75*	104 1/2	96 1/2	66,000	1,149,000	Aluminum Ltd., 5s. ....	1948	5	J. J.	20,000,000
11	11	11	56	10	60	51	2,000	61,000	Amer. Solv. & Chem. 6 1/2s. ....	1936	6 1/2	M. S.	1,737,000
35	33	35	43	29	80	51	12,000	353,000	General Rayon 6s. "A" ....	1948	6	J. D.	5,085,000
99	99 1/2	98 1/2	103 1/2	40 1/2	104	90 1/2	137,000	1,184,000	Gulf Oil, 5s. ....	1937	5	J. D.	30,414,000
96 1/2	98	96	104	86	104	99	172,000	2,898,000	Sinking Fund deb. 5s. ....	1947	5	F. A.	35,000,000
87 1/2	90 1/2	84 1/2	102 1/2	84	103 1/2	95 1/2	260,000	2,039,000	Koppers G. & C. deb. 5s. ....	1947	5	J. D.	23,050,000
78 1/2	87 1/2	78 1/2	98 1/2	78 1/2*	98 1/2	90 1/2	82,000	3,360,000	Shawinigan W. & P. 4 1/2s. "A" ....	1967	4 1/2	A. O.	35,000,000
103	103	101 1/2	104	101	103 1/2	90 1/2	39,000	2,055,000	4 1/2s., series "B" ....	1968	4 1/2	M. N.	16,108,000
100	101	99	104 1/2	99*	103 1/2	100 1/2	60,000	966,000	Swift & Co., 5s. ....	1944	5	J. J.	22,916,000
							30,000	300,000	Westvaco Chlorine Prod. 5 1/2s. ....	1937	5 1/2	M. S.	1,992,000

†New high for year

\*New low for year

# The Trend of Prices

**Weakness in nearly all commodity markets developed during late November offsetting most of the earlier gains. Chemical Markets' Average Price for 20 representative industrial chemicals was lower. National Fertilizer, Annalist, and N. Y. Journal of Commerce chemical indices were also lower.**

Chemical prices went to slightly lower levels in November, but in several divisions unmistakable indications point to recovery. With the termination of the Atlanta Fertilizer Association Meeting, strengthening of mixed fertilizer ingredients was reported. Alkali producers announced a repetition of the schedule placed in effect early this year after the disastrous war a year ago. Unless the unexpected should occur alcohol levels will be much higher.

## Lower Indices

The chemical and allied industries' wholesale price indices, part of the complete National Fertilizer Association Index of wholesale prices, show lower chemical and drug prices and higher levels for fats and oils, fertilizer materials lower, and mixed fertilizers higher.

Groups	Preceding Month	Nov. 21	Year Ago
Fats and oils.....	60.4	60.1	62.2
Chemicals and drugs...	86.7	86.7	86.8
Fertilizer materials....	70.5	70.8	71.4
Mixed fertilizer.....	80.2	80.2	79.7

All groups combined. 67.5 67.4 66.6 80.9

Some unsettlement continued in bichromates with consumers in some instances showing disinclination to contract. On the whole, the new price level is holding fairly satisfactorily. Glycerine prices unexpectedly went to lower levels, the quicksilver market finally reached demoralization with prices quoted purely nominal. Copper sulfate and copper cyanide, reflecting the supposed failure of the international copper conference with its attending drop of the metal to 6¼c, showed declines of 30c a cwt., and 2c respectively. The ammonia schedule was repeated,\* some weakness was reported in muriatic; shellac prices regis-

\*Spot tanks slightly higher

tered sharp declines, waxes were firm and in some instances, slightly higher, gums showed little change, and fats and oils made impressive gains in the first two weeks only to falter with the change in sentiment, decline in silver, and general unsettlement in the Far East. Naval stores was a bright spot. While the industry is, of course, still in bad condition, worthwhile advances were made and held in turpentine and in all rosin grades.

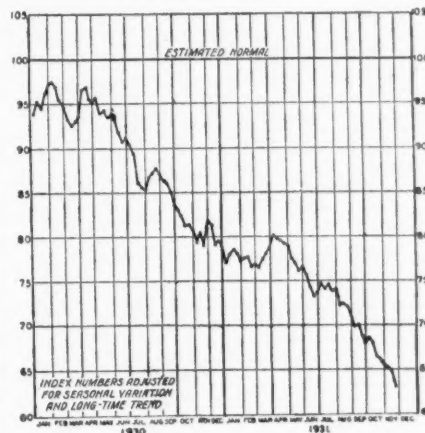
Actual shipments for November were less in number, and generally speaking, total tonnages of most industrial chemicals declined below figures registered in October, making new low record for activity. Little improvement, and in all probability, further restriction will occur in December. Companies will carry very little in the way of inventories into 1932. Encouraging, however, is the rate at which contracts for the coming year are being concluded. In this respect the current contract season is a vast improvement over last.

## General Business

Mid-month optimism and rising prices generally gave away in the closing days for the one reason that they could not be sustained by pointing to any substantial

gains in the business structure. Retail trade has been seriously handicapped for weeks because of unseasonably hot weather. Commodity markets, grain, rubber, metals, cotton, and sugar lost most, if not all of the recent spectacular recovery. Steel and automobile industries failed to improve although a pick-up in both is quite probable in December. The stock market, international finances, possibility of warfare in the East, and the refusal of railroad employees to accept lower wage level were some factors held responsible for the about face in sentiment.

New York Times weekly index of business activity showed a sharp decline in the last half of the month, influenced principally by a renewed decline in freight.



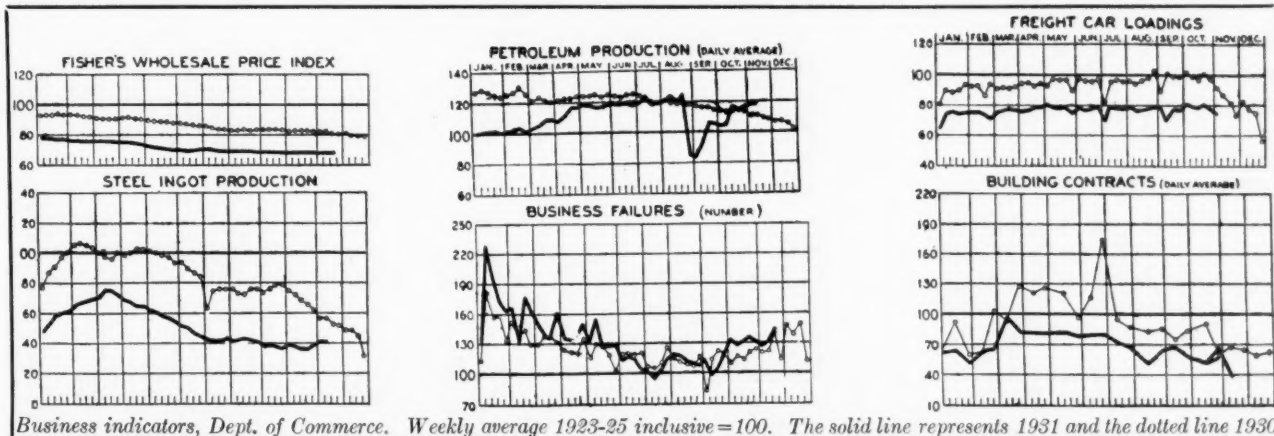
	Week Ended	Nov. 21	Nov. 14	Nov. 22
	1931	1931	1931	1930
Freight car loadings.....		63.8	67.0	76.2
Steel mill activity.....		36.1	41.6	58.3
Electric power production....		76.6	75.9	85.9
Automobile production.....		17.8	16.5	87.7
Carded cotton cloth prod....		93.5	92.4	78.4
Combined index.....		63.2	64.6	79.0

\*Subject to revision.

## Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, October.....	80,142	140,566	154,401
†Brokers Loans.....	\$751	\$775	\$2,122
*Building Contracts, October.....	\$242,094	\$252,109	\$337,301
*Car Loadings, Nov. 28.....	690	717	823
†Commercial Paper, Oct. 31.....	\$210	\$248	\$485
Payrolls, October.....	59.4	61.8	80.8
*Mail Order Sales, September.....	\$45,955	\$43,004	\$54,439
Failures, Dun, October.....	2,362	1,936	2,124
*Merchandise Imports, October.....	\$169,000	\$171,000	\$247,367
*Merchandise Exports, October.....	\$205,000	\$181,000	\$326,896
Furnaces in Blast, Nov. 1.....	22.3%	22.2%	35.4%
*Steel Orders, Oct. 31.....	3,119	3,144	3,481

\*000 omitted. †000,000 omitted.



Business indicators, Dept. of Commerce. Weekly average 1923-25 inclusive = 100. The solid line represents 1931 and the dotted line 1930

# Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tan-stuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations

f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

## Important Price Changes

Advances	Nov.	Oct.
Blood, dried.....	\$ 2.00	\$ 1.75
Butanol, tanks*.....	14.3	14.5
Butyl Acetate, tanks*.....	14.4	14.6
Dextrine, white.....	3.52	3.42
Dextrine, gum.....	2.82	2.72
Dextrine, canary.....	3.57	3.47
Egg, Albumen.....	.73	.70
Fish Scrap.....	2.50	1.95
Japan Wax.....	.09½	.07
Turpentine.....	.40¾	.37

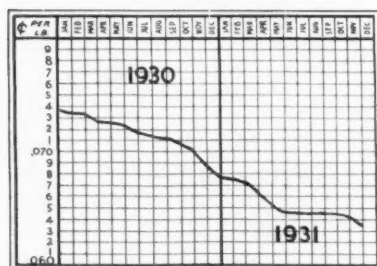
## Declines

Ammonium Sulfate, imp....	\$21.00	\$22.00
Ammonium Sulfate, dom....	22.00	25.00
Copper Cyanide.....	.39	.41
Copper Sulfate.....	3.10	3.40
Cream of Tartar.....	.21¼	.21½
Glycerine, soap, lye.....	.04¾	.05
Glycerine, C. P.....	.11¼	.11½
Glycerine, dynamite.....	.09	.09¾
Glycerine, saponification.....	.06	.06½
Quicksilver.....	64.00	72.00
Salt Cake.....	14.00	14.50
Shellac, T. N.....	.14½	.16
Shellac, bone dry.....	.26	.28

\*1932 Contract Prices, Dec. 1

## CHEMICAL MARKETS Av. Price Goes to New Low Level

CHEMICAL MARKETS representative average price of 20 industrial chemicals declined to a new low for the current recession in business when sodium bichromate was reduced from 7c to 6½c



and copper sulfate from \$3.40 a cwt. to \$3.10. The price is made up of the following chemicals in addition to bichromate of soda and blue vitriol; acids, acetic and sulfuric, anhydrous ammonia, caustic soda, chlorine, betanaphthol, phenol, formaldehyde, c. d. No. 5 alcohol, carbon tetrachloride, synthetic methanol, ethyl acetate, lithopone, red lead, zinc oxide, sodium nitrate crude, tri-sodium phosphate, caustic potash. November figure stood at .0637, as against .0641 for October.

Acetone — Only a routine demand prevailed in November but prices were firm

	Current Market	Low	High	High	Low	High	Low
Acetaldehyde, drs 10-1 wks...lb.	.18½	.21	.18½	.21	.18½	.21	.18½
Acetalol, 50 gal dr.....lb.	.27	.31	.27	.31	.27	.31	.27
Acetamide.....lb.	.95	1.35	.95	1.35	1.20		
Acetanilid, tech, 150 lb bbl.....lb.	.20	.23	.20	.23	.21	.24	.21
Acetic Anhydride, 92-95%, 100 lb cys.....lb.	.21	.25	.21	.25	.25	.35	.28
Acetin, tech drums.....lb.	.30	.32	.30	.32	.30	.32	.30
Acetone, tanks.....lb.		.10	.10	.10½	.12	.11	.16
Acetone Oil, bbls NY.....gal.	1.15	1.25	1.15	1.25	1.15	1.25	1.15
Acetyl Chloride, 100 lb cys.....lb.	.55	.68	.55	.68	.55	.68	.45
Acetylene Tetrachloride (see tetrachlorethane)							
Acids							
Acid Abietic.....	.12	.12	.12	.12			
Acetic, 28% 400 lb bbls o-1 wks.....100 lb.	2.40	2.60	2.40	2.60	3.88	2.60	3.88
Glacial, bbl o-1 wk.....100 lb.	8.35	8.60	8.35	9.23	13.68	9.23	13.68
Glacial, tanks.....	8.10		8.10	8.98	13.43	8.98	
Adipic.....	.72	.72	.72	.72			
Anthranelic, retd, bbls.....lb.	.85	.95	.85	.95	1.00	.85	1.00
Technical, bbls.....lb.	.65	.70	.65	.80	.80	.75	.80
Battery, cys.....100 lb.	1.60	2.25	1.60	2.25	1.60	2.25	1.60
Benzoic, tech, 100 lb bbls.....lb.	.35	.45	.35	.45	.53	.40	.60
Boric, cys. powd, 250 lb. bbls.....lb.	.06½	.07	.06½	.07½	.07½	.06½	.07½
Broenner's, bbls.....lb.	1.20	1.25	1.20	1.25	1.25	1.20	1.25
Butyric, 100% basis cys.....lb.	.80	.85	.80	.85	.90	.80	.90
Camphoric.....		5.25		5.25	5.25	5.25	4.85
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½	.04½	.05½	.05½	.04½	.05½
Chromic, 99½%, drs.....lb.	.14½	.16	.14½	.17	.19	.15	.23
Chromotropic, 300 lb bbls.....lb.	1.00	1.06	1.00	1.06	1.06	1.00	1.06
Citric, USP, crystals, 230 lb. bbls.....lb.		.35	.35	.43	.59	.40	.70
Cleve's, 250 lb bbls.....lb.	.52	.54	.52	.54	.54	.52	.59
Crocylic, 95%, dark drs NY.....gal.	.47	.60	.47	.60	.70	.54	.60
97-99%, pale drs NY.....gal.	.54	.58	.50	.60	.77	.58	.77
Formic, tech 90%, 140 lb. cys.....lb.	.10½	.12	.10½	.12	.12	.10½	.12
Gallic, tech, bbls.....lb.	.60	.70	.60	.70	.55	.50	.12
USP, bbls.....lb.		.74		.74	.74	.74	.55
Gamma, 225 lb bbls wks.....lb.	.77	.80	.77	.80	.80	.77	.80
H, 225 lb bbls wks.....lb.	.60	.65	.60	.70	.70	.65	.99
Hydriodic, USP, 10% soln cys lb.....		.67		.67	.67	.67	.72
Hydrobromic, 48%, coml, 155 lb cys wks.....lb.	.45	.48	.45	.48	.48	.45	.48
Hydrochloric, CP, see Acid Muriatic							
Hydrocyanic, cylinders wks.....lb.	.80	.90	.80	.90	.90	.80	.90
Hydrofluoric, 30%, 400 lb bbls wks.....lb.		.06		.06	.06½	.06	.06
Hydrofluosilicic, 35%, 400 lb bbls wks.....lb.	.11	.12	.11	.12	.12	.11	.11
Hypophosphorous, 30%, USP, demijohns.....lb.		.85		.85	.85	.85	.85
Lactic, 22%, dark, 500 lb bbls lb.....	.04	.04½	.04	.04½	.05	.04	.05½
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.12	.11	.12½
Laurent's, 250 lb bbls.....lb.	.36	.42	.36	.42	.42	.36	.42
Linoleic.....lb.	.16	.16	.16	.16			
Malic, powd., kegs.....lb.	.45	.60	.45	.60	.60	.45	.60
Metanilic, 250 lb bbls.....lb.	.60	.65	.60	.65	.65	.60	.65
Mixed Sulfuric-Nitric.....							
tanks wks.....N unit	.07	.07½	.07	.07½	.07½	.07	.07½
tanks wks.....S unit	.008	.01	.008	.01	.01	.008	.01
Monochloroacetic, tech bbl.....lb.	.20	.30	.20	.30	.30	.18	.21
Monosulfonic, bbls.....lb.	1.65	1.70	1.65	1.70	1.70	1.65	1.70
Muriatic, 18 deg, 120 lb cys o-1 wks.....100 lb.		1.35		1.35	1.35	1.35	1.40
tanks, wks. 100 lb.		1.00		1.00	1.00	1.00	1.00
20 degrees, cys wks.....100 lb.		1.45		1.45		1.45	1.45
N & W, 250 lb bbls.....lb.	.85	.95	.85	.95	.95	.85	.95
Naphthionic, tech, 250 lb lb.....	.60	.65	.60	.65	Nom.		.59
Nitric, 36 deg, 135 lb cys o-1 wks.....100 lb.		5.00		5.00	5.00	5.00	5.00
40 deg, 135 lb cys, o-1 wks.....100 lb.		6.00		6.00	6.00	6.00	6.00
Oxalic, 300 lb bbls wks NY.....lb.	.11	.11½	.10½	.11½	.11½	.11	.11½
Phosphoric 50% U. S. P.....lb.		.14		.14	.14	.14	.14
Syrupy, USP, 70 lb drs.....lb.		.14		.14	.14	.14	.14
Commercial, tanks.....Unit.		.80		.80	.80	.80	
Picramic, 300 lb bbls.....lb.	.65	.70	.65	.70	.70	.65	.70
Picric, kegs.....lb.	.30	.50	.30	.50	.50	.30	.50
Pyrogallie, crystals.....lb.	1.50	1.60	1.50	1.60	1.60	1.30	1.40
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.37	.33	.42
Sulfanilic, 250 lb bbls.....lb.	.15	.16	.15	.16	.16	.15	.16
Sulfuric, 66 deg, 180 lb cys 10-1 wks.....100 lb.	1.60	1.95	1.60	1.95	1.95	1.60	1.95
tanks, wks. ton	15.00			15.00	15.50	15.00	15.50
1500 lb dr wks.....100 lb.	1.50	1.65	1.50	1.65	1.65	1.50	1.65
60°, 1500 lb dr wks.....100 lb.	1.27½	1.42½	1.27½	1.42½	1.42½	1.27½	1.42½

# HAPPY NEW YEAR

Prosperity may not be just around the corner,  
but—

The forces of reconstruction are active.  
Broader and more substantial foundations are  
being built.

Business in many lines is recovering.

Confidence is succeeding timidity.

With others, we have had our trials and tribu-  
lations during the depression.

Thankful we are, however, that in supplying the  
needs of our customers we have, by enlightened  
management, been able to keep our works op-  
erating at full time, and to retain the services of  
our loyal employees.

Imbued with confidence and hope, we look for-  
ward to sharing with all those with whom we  
are privileged to do business—  
*a prosperous new year!*



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MERCK & CO. LTD.

Montreal

Chemical Markets

## Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

and unchanged. Some improvement in volume is hoped for late in December with the usual step-up in automobile production schedules.

**Acid Acetic** — Shipments were off slightly in the first three weeks of the month but some improvement was reported in the final week. Textile activity fell slightly as the in-between-season approached. Prices were steady at recent reductions.

**Acid Chromic** — Activity in the automobile centers dropped to a new low in November with the result that further curtailment of orders for plating materials was necessary. Plans for December call, however, for a much larger production schedule in anticipation of demand for new models after the first of the year.

**Acid Oxalic** — Only a routine demand existed, but prices were sustained at previous level. Of the total September imports of 64,097 pounds, Germany shipped 49,112 pounds and Holland 14,985 pounds.

**Acid Sulfuric** — Producers were closing business for 1932 on the same basis as prevailed for 1931. Belief that the \$6 a ton freight rate increase contained in the I. C. C. proposal will become effective has had a stabilizing influence on the market. Producers have scaled down production to meet current restricted demand. Production of sulfuric acid by seventy-six manufacturers of superphosphate operating 104 plants during September was 102,632 short tons, against 110,599 tons in August and 172,529 tons in September last year, according to reports received by the United States Bureau of Census. Stocks of sulfuric acid in the hands of superphosphate makers at the end of September totaled 98,913 tons, against 92,529 tons at the end of August and 117,490 tons at the close of September, 1930. Consumption of sulfuric acid in the manufacture of superphosphate during September was 78,606 tons, against 94,860 tons in the month of August and 180,181 tons in September last year.

Production	Total	Northern district	Southern district
1931			
January.....	184,036	100,103	83,933
February.....	163,647	105,053	58,594
March.....	146,458	99,782	46,676
April.....	116,447	86,260	30,187
May.....	103,250	85,623	19,627
June.....	90,772	75,887	14,885
July.....	92,895	71,213	21,682
August.....	110,599	74,014	36,585
September*..	102,632	67,714	34,918
Totals, 9 mos.	1,112,736	765,649	347,087
1930			
January.....	206,319	106,431	99,888
February.....	196,289	102,978	93,311
March.....	197,313	110,788	86,525
April.....	188,621	111,339	77,282
May.....	193,881	112,998	80,883
June.....	169,892	98,683	71,209
July.....	154,457	89,985	64,472
August.....	179,420	106,782	72,638
September...	172,529	99,160	73,369
Totals, 9 mos.	1,658,721	939,144	719,577

	Current Market	Low	1931 High	1930 High	Low	1929 High	Low
Oleum, 20%, 1500 lb. drs 1c-1 wks.....	18.50		18.50	18.50	18.50	18.50	18.50
40%, 1c-1 wks net.....	42.00		42.00	42.00	42.00	42.00	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40	.30
Tartaric, USP, gran. powd, 300 lb bbls.....	.26½	.26½	.29½	.38½	.33	.38½	.38
Tobias, 250 lb bbls.....	.80	.85	.85	.85	.85	.85	.85
Trichloroacetic bottles.....	2.75		2.75	2.75	2.75	2.75	2.75
Kegs.....	2.00		2.00	2.00	2.00	2.00	2.00
Tungstic, bbls.....	1.40	1.40	1.70	1.70	1.40	2.25	1.00
Albumen, blood, 225 lb bbls...lb.	.38	.40	.38	.40	.38	.47	.38
dark.....	.12	.20	.12	.20	.12	.20	.12
Egg, edible.....	.65	.55	.60	.75	.55	.83	.70
Technical, 200 lb cases...lb.	.62	.66	.66	.73	.50	.80	.70
Vegetable, edible.....	.60	.65	.65	.65	.60	.65	.60
Technical.....	.50	.55	.55	.55	.50	.55	.50
<b>Alcohol</b>							
Alcohol Butyl, Normal, 50 gal drs o-1 wks.....	.1495	.1595	.1495	.17½	.18½	.17½	.17½
Drums, 1-c-1 wks.....	.1545	.1645	.1545	.17½	.18½	.17½	.17½
Tank cars wks.....		.1445	.1445	.16½	.17½	.16½	.16½
Amyl (from pentane)							
Tanks wks.....	.203	.203	.236	.236	.236	1.67	1.67
Diacetone, 50 gal drs del. gal.	1.42	1.60	1.42	1.60	1.42	1.80	1.42
Ethyl, USP, 190 pf, 50 gal bbls.....	2.55	2.65	2.37	2.75	2.75	2.63	2.69½
Anhydrous, drums.....	.54	.58	.54	.60	.71	.56	.71
No. 5, 188 pf, 50 gal drs drums extra.....	.28	.29	.27	.44	.50	.40	.51
*Tank, cars.....	.25	.24	.38	.48	.37	.50	.46
Isopropyl, ref, gal drs.....	.60	.65	.60	1.00	1.00	.60	1.30
Propyl Normal, 50 gal dr. gal.	1.00		1.00	1.00	1.00	1.00	1.00
Alcotate, tanks.....	.60	.60	.60				
Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.80	.82	.80	.82	.80
Alpha-Naphthol, crude, 300 lb bbls.....	.60	.65	.60	.65	.60	.65	.65
Alpha-Naphthylamine, 350 lb bbls.....	.32	.34	.32	.34	.32	.34	.32
Alum Ammonia, lump, 400 lb bbls, 1c-1 wks.....	3.00	3.25	3.00	3.50	3.50	3.20	3.25
Chrome, 500 lb casks.....	4.50	5.25	4.50	5.25	5.25	4.50	5.00
Potash, lump, 400 lb casks wks.....	3.00	3.50	3.00	3.50	3.50	3.10	3.00
Soda, ground, 400 lb bbls wks.....	3.50	3.75	3.50	3.75	3.75	3.50	3.75
Aluminum Metal, o-1 NY 100 lb.	22.90	24.30	22.90	24.30	24.30	24.30	24.30
Chloride Anhydrous.....	.05	.09	.05	.09	.15	.05	.20
Hydrate, 96%, light, 90 lb bbls.....	.16	.17	.16	.17	.18	.16	.17
Stearate, 100 lb bbls.....	.20	.21	.18	.22	.26	.19	.26
Sulfate, Iron, free, bags o-1 wks.....	1.90	1.95	1.90	1.95	2.05	1.90	2.05
Coml, bags o-1 wks.....	1.25	1.30	1.25	1.30	1.40	1.25	1.40
Aminobenzene, 110 lb kegs lb.	1.15		1.15	1.15	1.15	1.15	1.15
<b>Ammonium</b>							
Ammonia anhydrous Com. tanks.....	.05½		.05½	.05½	.05½		
Ammonia, anhyd. 100 lb cyl. lb.	.15½	.15½	.15½	.15½	.15½	.14½	.14
Water, 26", 800 lb dr del. lb.	.02½	.03	.02½	.03	.03	.03½	.03½
Ammonia, aqua 26" tanks.....	.02½	.02½	.02½	.02½	.02½		
Acetate.....	.28	.39	.28	.39	.39	.28	
Bicarbonate, bbls., f.o.b. plant.....	8.15		5.15	5.15	5.15	6.50	5.15
Bifluoride, 300 lb bbls.....	.21	.22	.21	.22	.22	.21	.21
Carbonate, tech, 500 lb cs. lb.	.10½	.12	.09	.12	.12	.09	.09
Chloride, white, 100 lb bbls wks.....	4.45	5.15	4.45	5.15	5.15	4.45	4.45
Gray, 250 lb bbls wks.....	5.25	5.75	5.25	5.75	5.75	5.25	5.25
Lump, 500 lb cks spot.....	.11	.11½	.11	.11½	.11	.11½	.11
Lactate, 500 lb bbls.....	.15	.16	.15	.16	.16	.15	.15
Ammonium Linoleate.....	.15	.15	.15				
Nitrate, tech, casks.....	.06	.10	.06	.10	.10	.06	.06
Persulfate, 112 lb kegs.....	.25	.27½	.25	.30	.30	.26	.26
Phosphate, tech, powd, 325 lb bbls.....	.11½	.12	.11½	.12	.13	.11½	.12½
Sulfate, bulk o-1.....	1.10	1.10	1.80	2.10	1.75	2.40	2.05
Southern points.....	1.25	1.25	1.75	2.10	1.82½	2.45	2.05
Nitrate, 26% nitrogen							
31.6% ammonia imported							
bags o. i. f.....	34.60	35.00	34.60	35.00	57.60	45.00	60.85
Sulfoamide, kegs.....	.36	.48	.36	.48	.48	.36	.48
Amyl Acetate, (from pentane)							
Tanks.....	.17½	.16	.222	.236	.222	1.70	1.60
Tech. drs.....	.17½	.18	.16½	.236	.24	.225	.24
Alcohol, sec Fusel Oil.....							
Furoate, 1 lb tins.....	5.00		5.00	5.00	5.00		
Aniline Oil, 960 lb drs.....	.14½	.16	.14½	.16	.15	.16½	.15
Annatto, fine.....	.34	.37	.34	.37	.37	.34	.34
Anthraquinone, sublimed, 125 lb bbls.....	.50	.55	.50	.55	.90	.50	.80
Antimony, metal slabs, ton lots							
Needle, powd, 100 lb cs.....	.08½	.06½	.06½	.07½	.09½	.06½	.08
Chloride, soda (butter of) obys.....	.13	.17	.13	.17	.17	.13	.13
Oxide, 500 lb bbls.....	.08½	.08½	.08½	.08½	.08½	.07	.08½
Salt, 66%, tins.....	.22	.24	.22	.24	.24	.22	.24
Sulfuret, golden, bbls.....	.16	.20	.16	.20	.20	.16	.20
Vermilion, bbls.....	.38	.42	.38	.42	.42	.38	.42
Archil, conc, 600 lb bbls.....	.17	.19	.17	.19	.19	.17	.17
Double, 600 lb bbls.....	.12	.14	.12	.14	.14	.12	.12
Triple, 600 lb bbls.....	.12	.14	.12	.14	.14	.12	.12
Argols, 80%, casks.....	.18½	.18½	.18½	.18½	.18½	.18½	.18½
Crude, 30%, casks.....	.07	.07½	.07	.08	.08	.07½	.08
*New formula							

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## GLAUBER'S SALT

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Sodium Sulphide  
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## Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

**Alcohol** — To date the anti-freeze business has been decidedly disappointing. Jobbers have been loathe to stock ahead in any large quantities after moving initial shipments into retail trade channels. Producers are insisting that consumers either take monthly quota or cancel the equivalent quantity. This action has effected more activity and with prices likely to be at least 2c higher for the coming year it is expected that shipments in December will be much larger.

**Alums** — The demand continued at a fairly satisfactory pace. Activity, however, in paper industry is still far from encouraging.

**Ammonium Sulfate** — Despite the fact that steel and coking operations are but one-third normal and stocks are not thought to be very large, domestic material went to \$22 and imported to \$21-\$22. Ammonium sulfate did not participate in the rally of most fertilizer ingredients to higher levels with the close of the successful Atlanta convention. Ammonium sulfate imports into U. S. during September totaled 13,809 long tons, a record for postwar years.

Calendar year	Long tons	Calendar year	Long tons
1925	23,762	1928	37,619
1926	8,386	1929	19,052
1927	17,153	1930	34,964
	1931 (9 mos.)		56,764

A feature of the September import trade was the entry of 9,950 tons reported from Belgium. Of total receipts during first nine months of 1931, Belgium is shown as source of 19,361 tons, France, 1,361, Germany 8,667, Netherlands 16,835, Canada 1,862, and Japan 8,678 tons.

**Antimony** — The metal passed through a dull and listless period with the price fairly well stabilized at 6½c. U. S. imports of antimony ore and metal were lower in 1930 than in any year during previous decade, and statistics indicate continued falling off in receipts of metallic antimony but a very decided increase in those of ore during 1931. Total imports of metallic antimony in 1930 amounted to 8,506 short tons, valued at \$902,986—5,924 tons less than 1929 imports and a decrease of 3,843 tons from the 1928 figure. China continues to serve as principal source of supply, furnishing 6,628 short tons, or about 78 per cent of the total imports in 1930. Mexico's contribution last year increased slightly to 1,402 short tons of metallic antimony, from 1,180 tons in 1929. During first eight months of 1931 imports of metallic antimony amounted to 3,772 short tons, valued at \$336,843—figures which justify the expectation of a decline in 1931 of 30 to 35 per cent from last year's total.

	Current Market	Low	High	1931 High	1930 Low	1929 High	Low
Aroclors, wks. .... lb.	.20	.40	.20	.40	.20	.....	.....
Arsenic, Red, 224 lb kegs, cs. lb.	.09½	.10	.09½	.10	.11	.08½	.11
White, 112 lb kegs. .... lb.	.04	.05	.03½	.05	.04½	.03½	.04½
Asbestine, c-1 wks. .... ton	15.00	.....	15.00	15.00	15.00	15.00	4.75
<b>Barium</b>							
Barium Carbonate, 200 lb bags wks. .... ton	56.50	57.00	56.50	60.00	60.00	58.00	60.00
Chlorate, 112 lb kegs NY. lb.	.14	.15	.14	.15	.15	.14	.15
Chloride, 600 lb bbl wks. .... ton	63.00	69.00	63.00	69.00	69.00	63.00	69.00
Dioxide, 88%, 690 lb drs. .... lb.	.12	.13	.12	.13	.13	.12	.13
Hydrate, 500 lb bbls. .... lb.	.04½	.05½	.04½	.05½	.05½	.04½	.05½
Nitrate, 700 lb casks. .... lb.	.07½	.08	.07½	.08½	.08½	.07½	.08½
Barytes, Floated, 350 lb bbls wks. .... ton	23.00	24.00	23.00	24.00	24.00	23.00	24.00
Bauxite, bulk, mines. .... ton	5.00	6.00	5.00	8.00	8.00	5.00	8.00
Beeswax, Yellow, crude bags. lb.	.22	.24	.22	.31	.34	.24	.37
Refined, cases. .... lb.	.25	.28	.25	.37	.38	.37	.42
White, cases. .... lb.	.34	.36	.34	.36	.53	.34	.53
Benzaldehyde, technical, 945 lb drums wks. .... lb.	.60	.65	.60	.65	.65	.60	.65
<b>Benzene</b>							
Benzene, 90%, Industrial, 8000 gal tanks wks. .... gal.	.....	.20	.18	.21	.22	.21	.23
Ind. Pure, tanks works. .... gal.	.....	.20	.18	.21	.22	.21	.23
Benzidine Base, dry, 250 lb bbls. .... lb.	.65	.67	.65	.67	.74	.65	.74
Benzoyl, Chloride, 500 lb drs. lb.	.45	.47	.45	.47	1.00	.45	1.00
Benzyl, Chloride, tech drs. .... lb.	.....	.30	.....	.30	.25	.25	.25
Beta-Naphthol, 250 lb bbl wk. lb.	.22	.24	.22	.24	.24	.22	.26
Naphthylamine, sublimed, 200 lb bbls. .... lb.	1.25	1.35	1.25	1.35	1.35	1.25	1.35
Tech, 200 lb bbls. .... lb.	.53	.58	.53	.65	.65	.53	.68
Blanc Fixe, 400 lb bbls wks. ton	75.00	90.00	75.00	90.00	90.00	75.00	90.00
<b>Bleaching Powder</b>							
Bleaching Powder, 300 lb drs c-1 wks contract. .... 100 lb	1.75	2.00	1.75	2.35	2.35	2.00	2.25
Blood, Dried, fob, NY. .... Unit	.....	2.00	1.65	3.00	3.90	3.00	4.60
Chicago. .... Unit	1.50	1.60	1.50	2.35	4.50	2.75	5.00
S. American shipt. .... Unit	.....	Nom.	2.00	3.20	4.10	3.15	4.70
Blues, Bronze Chinese Milori Prussian Soluble. .... lb.	.....	.35	.....	.35	.35	.35	.35
Bone, raw, Chicago. .... ton	21.00	21.50	21.00	32.00	39.00	31.00	42.00
Bone, Ash, 100 lb kegs. .... lb.	.06	.07	.06	.07	.07	.06	.07
Black, 200 lb bbls. .... lb.	.05½	.08½	.05½	.08½	.08½	.05½	.08½
Meal, 3% & 50%, Imp. .... ton	.....	21.00	21.00	31.00	31.00	31.00	35.00
Borax, bags. .... lb.	.02½	.03½	.02½	.03½	.03½	.02½	.03½
Bordeaux, Mixture, 16% pwd. lb.	.11½	.13	.11½	.13	.14	.12	.14
Paste, bbls. .... lb.	.11½	.13	.11½	.13	.14	.12	.14
Brazilwood, sticks, shpmt. .... lb.	26.00	28.00	26.00	28.00	28.00	26.00	28.00
Bromine, cases. .... lb.	.36	.43	.36	.43	.47	.38	.47
Bronze, Aluminum, powd blk. lb.	.60	1.20	.60	1.20	1.20	.60	1.20
Gold bulk. .... lb.	.55	1.25	.55	1.25	1.25	.55	1.25
Butyl, Acetate, normal drs. lb.	.161	.166	.161	.175	.20	.17	.195
Tank, wks. .... lb.	.....	.146	.146	.175	.186	.16	.186
Aldehyde, 50 gal drs wks. .... lb.	.34	.36	.34	.44	.44	.34	.70
Carbitol see Diethylene Glycol Mono (Butyl Ether) ....	.....	.....	.....	.....	.....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether) ....	.....	.....	.....	.....	.....	.....	.....
Furoate, tech, 50 gal. dr., lb.	.....	.50	.....	.50	.50	.50	.50
Propionate, drs. .... lb.	.22	.25	.22	.25	.27	.22	.36
Stearate, 50 gal drs. .... lb.	.....	.25½	.25	.30	.30	.25	.60
Tartrate, drs. .... lb.	.55	.60	.55	.60	.60	.55	.60
Cadmium, Sulfide, boxes. .... lb.	.65	.90	.65	.90	1.75	.90	1.75
<b>Calcium</b>							
Calcium, Acetate, 150 lb bags c-1. .... 100 lb	.....	2.00	.....	2.00	4.50	2.00	4.50
Arsenate, 100 lb bbls c-1 wks. .... lb.	.06	.08	.06	.09	.09	.07	.09
Carbide, drs. .... lb.	.05	.06	.05	.06	.06	.05	.06
Carbonate, tech, 100 lb bags c-1. .... lb.	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks. .... ton	.....	22.75	.....	22.75	22.75	22.75	25.00
Solid, 650 lb drs c-1 fob wks. .... ton	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Nitrate, 100 lb bags. .... ton	34.00	35.00	34.00	43.00	43.00	40.00	52.00
Peroxide, 100 lb. drs. .... lb.	.....	1.25	.....	1.25	1.25	1.25	1.25
Phosphate, tech, 450 lb bbls lb.	.08	.08½	.08	.08½	.08½	.08	.07
Stearate, 100 lb bbls. .... lb.	.17	.18	.17	.22	.26	.19	.26
Calurea, bags S. points. c.f. ton	.....	88.65	.....	88.65	88.65	88.65	82.15
Camwood, Bark, ground bbls. lb.	.....	.18	.....	.18	.18	.18	.18
Candelilla Wax, bags. .... lb.	.13	.13½	.13	.15	.20	.15	.24
Carbitol (See Diethylene Glycol Mono Ethyl Ether) ....	.....	.....	.....	.....	.....	.....	.....
Carbon, Decolorizing, 40 lb bags c-1. .... lb.	.08	.15	.08	.15	.15	.08	.15
Black, 100-300 lb cases 1c-1 NY. .... lb.	.06	.12	.06	.12	.12	.06	.12
Bisulfite, 500 lb drs 1c-1 NY. .... lb.	.05½	.06	.05½	.06	.06	.05½	.06
Dioxide, Lq. 20-25 lb cyl. .... lb.	.....	.06	.....	.06	.18	.06	.06
Tetrachloride, 1400 lb drs deliv. red. .... lb.	.06½	.07	.06½	.07	.07	.06½	.07½
Carnauba Wax, Flor, bags. .... lb.	.26	.28	.26	.28	.37	.28	.43
No. 1 Yellow, bags. .... lb.	.....	.30	.23	.40	.33	.25	.40
No. 2 N Country, bags. .... lb.	.17	.17½	.15	.23	.27	.20	.32
No. 2 Regular, bags. .... lb.	.....	.36	.21	.23	.30	.23	.36
No. 3 N. C. .... lb.	.12	.13	.12	.11	.23	.16	.25
No. 3 Chalky. .... lb.	.12	.13	.11	.13½	.23	.16	.26
Casein, Standard, Domestic. .... ground. .... lb.	.07	.07½	.06	.10	.15½	.09½	.17

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CARBITOL ★	METHANOL
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# Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

**Calcium Acetate** — No change in the price structure of this commodity has occurred in several months. Demand shows no indication of immediate improvement. During third quarter there was sharp contraction in stocks and total output. Production for nine months of 1931 amounted to 34,042,486 lbs. compared to 57,436,301 lbs. in the 1930 period. Stocks as of September 30, were: 1931—10,791,347 lbs.; 1930—24,928,422 lbs.

Acetate of Lime (in pounds)			
1930	Production	Shipments	Stocks
Jan.....	9,200,412	2,905,559	11,483,936
Feb.....	7,349,140	3,626,064	15,207,012
March....	8,832,625	6,296,684	17,742,953
April.....	7,858,995	4,762,359	20,839,589
May.....	6,586,953	5,649,178	21,777,364
June.....	4,734,776	5,609,485	20,902,652
July.....	3,455,112	3,061,333	21,296,431
Aug.....	3,522,506	2,446,939	22,371,998
Sept.....	5,895,782	3,339,358	24,928,422
(9 mos)	257,436,301	37,696,962	
Oct.....	5,871,269	7,922,056	22,877,635
Nov.....	6,534,761	9,127,638	20,284,758
Dec.....	7,357,079	8,375,451	19,266,386
Total (Yr 1931)	277,199,410	63,122,107	
Jan.....	8,023,412	5,194,666	22,095,132
Feb.....	7,073,296	3,467,674	25,700,754
March....	7,451,581	4,465,248	28,678,087
April.....	4,400,047	5,160,348	27,926,786
May.....	2,952,982	4,673,898	26,205,870
June.....	1,853,057	3,855,983	24,202,944
July.....	840,064	4,654,342	20,388,666
Aug.....	665,916	4,777,154	16,277,428
Sept.**	782,131	6,268,212	10,791,347
(9 mos)	34,042,468	42,517,525	

\*Revised. \*\*Preliminary.

**Chlorine** — Shipments were being held down by consumers anxious to close the year with small inventories. The writing of 1932 contracts continued satisfactorily and it is reported that they are practically all negotiated.

**Borax** — The demand was fairly well sustained and prices steady. Of the September exports of 12,409,475 pounds, Germany received 3,552,356 pounds; Holland, 2,160,694 pounds, and the United Kingdom, 2,378,871 pounds. Canada received 587,763 pounds.

**Coal Tar Chemicals** — Sales and shipments were much lower in volume in November. The prices of such products as benzol, toluene, etc., remained very firm due to the lack of any improvement in coking operations. At the moment a balance has been struck between production and consumption and unless a sharp increase in the steel industry forces coke-oven operation to higher levels, the firm undertone now existing is very likely to carry over into the first quarter of 1932 at least. No important price changes were recorded.

**Copperas** — The continued restriction of steel operations was reflected in market for copperas. No further advance was made during November.

	Current Market	Low	High	1931 Low	High	1930 Low	High	1929 Low	High
Cellosolve (see Ethylene glycol mono ethyl ether).....									
Acetate (see Ethylene glycol mono ethyl ether acetate).....									
Celluloid, Scraps, Ivory cas.....lb.	.13	.15	.13	.15	.20	.20	.30	.20	.18
Shell, cases.....lb.	.18	.20	.18	.20	.20	.18	.20	.18	.15
Transparent, cases.....lb.	.15	.15	.15	.15	.15	.15	.32	.15	.15
Cellulose, Acetate, 50 lb kegs.....lb.	.80	1.25	.80	1.25	1.25	.80	1.25	1.20	.03
Chalk, dropped, 175 lb bbls.....lb.	.03	.03	.03	.03	.03	.03	.03	.03	.02
Precip, heavy, 560 lb cks.....lb.	.02	.03	.02	.03	.03	.02	.03	.02	.02
Light, 250 lb cks.....lb.	.02	.03	.02	.03	.03	.02	.03	.02	.02
Charcoal, Hardwood, lump, bulk wks.....lb.	.18	.19	.18	.19	.19	.18	.19	.18	.18
Willow, powd, 100 lb bbl wks.....lb.	.06	.06	.06	.06	.06	.06	.06	.06	.06
Wood, powd, 100 lb bbls.....lb.	.04	.05	.04	.05	.05	.04	.05	.04	.04
Chestnut, clarified bbls wks.....lb.	.01	.02	.01	.03	.03	.02	.02	.03	.03
25% tks wks.....lb.	.01	.02	.01	.02	.02	.01	.02	.01	.01
Powd, 60%, 100 lb bgs wks.....lb.	.05	.06	.05	.06	.06	.05	.06	.05	.05
Powd, decolorized bgs wks.....lb.	.05	.06	.05	.06	.06	.05	.06	.05	.05
China Clay, lump, blk mines ton	8.00	9.00	8.00	9.00	9.00	8.00	9.00	8.00	8.00
Powdered, bbls.....lb.	.01	.02	.01	.02	.02	.01	.02	.01	.01
Pulverized, bbls wks.....ton	10.00	12.00	10.00	12.00	12.00	10.00	12.00	10.00	10.00
Imported, lump, bulk.....ton	15.00	25.00	15.00	25.00	25.00	15.00	25.00	15.00	15.00
Powdered, bbls.....lb.	.01	.03	.01	.03	.03	.01	.03	.01	.01

## Chlorine

Chlorine, cys 1-1 wks contract.....lb.	.07	.08	.07	.08	.08	.07	.08	.07	.07
cys, cl wks, contract.....lb.	.04	.04	.04	.04	.04	.04	.04	.04	.04
Liq tank or multi-car lot cys wks contract.....lb.	.01	.02	.01	.02	.025	.01	.03	.025	.025
Chlorobenzene, Mono, 100 lb drs 1-1 wks.....lb.	.10	.10	.10	.10	.10	.10	.10	.10	.08
Chloroform, tech, 1000 lb drs.....lb.	.15	.16	.15	.16	.16	.15	.20	.16	.16
Chloropierin, comml cys.....lb.	1.00	1.35	1.00	1.35	1.35	1.00	1.35	1.00	1.00
Chrome, Green, CP.....lb.	.26	.29	.26	.29	.29	.26	.29	.26	.26
Commercial.....lb.	.06	.11	.06	.11	.11	.06	.11	.06	.06
Yellow.....lb.	.16	.18	.16	.18	.18	.16	.18	.15	.15
Chromium, Acetate, 8% Chrome bbls.....lb.	.04	.05	.04	.05	.05	.04	.05	.04	.04
20° soln, 400 lb bbls.....lb.	.05	.05	.05	.05	.05	.05	.05	.05	.05
Fluoride, powd, 400 lb bbl.....lb.	.27	.28	.27	.28	.28	.27	.28	.27	.27
Oxide, green, bbls.....lb.	.34	.35	.34	.35	.35	.34	.35	.34	.34
Coal tar, bbls.....bbl	10.00	10.50	10.00	10.50	10.50	10.00	10.50	10.00	10.00
Cobalt Oxide, black, bags.....lb.	1.35	1.45	1.35	2.22	2.22	2.10	2.22	2.10	2.10
Cochineal, gray or black bag.....lb.	.52	.57	.52	.57	1.01	.52	1.01	.95	.95
Teneriffe silver, bags.....lb.	.57	.57	.55	.57	.95	.54	.95	.95	.95

## Copper

Copper, metal, electrol.....100 lb.	6.50	7.00	6.25	10.36	17.78	9.50	24.00	17.00	
Carbonate, 400 lb bbls.....lb.	.08	.16	.08	.16	.21	.08	.25	.13	.13
Chloride, 250 lb bbls.....lb.	.22	.25	.22	.25	.28	.22	.28	.25	.25
Cyanide, 100 lb drs.....lb.	.39	.40	.39	.42	.45	.41	.60	.44	.44
Oxide, red, 100 lb bbls.....lb.	.15	.16	.15	.18	.32	.15	.32	.16	.16
Sub-acetate verdigris, 400 lb bbls.....lb.	.18	.19	.18	.19	.19	.18	.19	.18	.18
Sulfate, bbls c-1 wks.....100 lb.	3.10	3.10	3.10	4.95	5.50	3.95	7.00	5.50	5.50
Copperas, cys and sugar bulk c-1 wks.....ton	14.50	13.00	14.00	14.00	14.00	13.00	14.00	13.00	13.00
Cotton, Soluble, wet, 100 lb bbls.....lb.	.40	.42	.40	.42	.42	.40	.42	.40	.40
Cottonseed, S. E. bulk c-1.....ton	25.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50	26.50
Meal S. E. bulk.....ton	13.25	38.00	13.25	38.00	38.00	37.50	38.00	37.50	37.50
7% Amm, bags mills.....ton	13.25	38.00	13.25	38.00	38.00	37.50	38.00	37.50	37.50
Cream Tartar, USP, 300 lb bbls.....lb.	.21	.21	.21	.24	.27	.24	.28	.26	.26
Creosote, USP, 42 lb cys.....lb.	.40	.42	.40	.42	.42	.40	.42	.40	.40
Oil, Grade 1 tanks.....gal.	.10	.11	.10	.12	.14	.10	.15	.12	.12
Grade 2.....gal.	.10	.11	.10	.12	.14	.10	.15	.12	.12
Grade 3.....gal.	.10	.11	.10	.12	.14	.10	.15	.12	.12
Creosol, USP, drums.....gal.	.10	.11	.10	.12	.14	.10	.15	.12	.12
Crotonaldehyde, 50 gal dr.....lb.	.32	.36	.32	.36	.36	.32	.36	.32	.32
Cudbear, English.....lb.	.16	.17	.16	.17	.17	.16	.17	.16	.16
Cutch, Rangoon, 100 lb bales.....lb.	.10	.12	.10	.13	.13	.11	.16	.12	.12
Borneo, Solid, 100 lb bale.....lb.	.05	.07	.05	.08	.08	.06	.08	.05	.05
Cyanamide, bags c-1 frt allowed Ammonia unit.....	.97	.97	.97	.97	.97	.97	.97	.97	.97
Dextrin, corn, 140 lb bags.....100 lb.	3.72	3.47	4.02	4.02	4.82	4.42	4.92	4.62	4.62
White, 140 lb bags.....100 lb.	3.52	3.67	3.42	4.02	4.77	4.17	4.87	4.57	4.57
Potato, Yellow, 220 lb bgs.....lb.	.08	.09	.08	.09	.09	.08	.09	.08	.08
White, 220 lb bags 1-1.....lb.	.08	.09	.08	.09	.09	.08	.09	.08	.08
Tapioca, 200 lb bags 1-1.....lb.	.08	.08	.08	.08	.08	.08	.08	.08	.08
Diamylphthalate, drs wks.....gal.	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
Dianisidine, barrels.....lb.	2.35	2.70	2.35	2.70	2.70	2.35	3.10	2.70	2.70
Dibutylphthalate, wks.....lb.	.228	.23	.228	.28	.28	.24	.26	.26	.26
Dibutyltartrate, 50 gal drs.....lb.	.29	.31	.29	.31	.31	.29	.31	.29	.29
Dichloroethylene, 50 gal dr.....lb.	.06	.06	.06	.06	.07	.05	.13	.05	.05
Dichloromethane, drs wks.....lb.	.55	.65	.55	.65	.65	.55	.65	.55	.55
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	3.00	2.75	3.00	2.75	2.75
Diethylcarbonate, drs.....gal.	1.85	1.90	1.85	1.90	1.90	1.85	1.90	1.85	1.85
Diethylaniline, 850 lb drs.....lb.	.55	.60	.55	.60	.60	.55	.60	.55	.55
Diethyleneglycol, drs.....lb.	.14	.16	.14	.16	.13	.10	.13	.10	.10
Mono ethyl ether, drs.....lb.	.15	.16	.15	.16	.16	.13	.15	.13	.13
Mono butyl ether, drs.....lb.	.24	.30	.24	.30	.30	.24	.30	.25	.25
Diethylene oxide, 50 gal dr.....lb.	.50	.50	.50	.50	.50	.50	.50	.50	.50
Diethyltoluoluidin, drs.....lb.	.64	.67	.64	.67	.67	.64	.67	.64	.64
Diethyl phthalate, 1000 lb drums.....lb.	.23	.26	.23	.26	.26	.24	.26	.24	.24
Diethylsulfate, technical, 50 gal drums.....lb.	.30	.35	.30	.35	.35	.30	.35	.30	.30
Dimethylamine, 400 lb drs.....lb.	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62
Dimethylaniline, 340 lb drs.....lb.	.25	.27	.25	.28	.28	.26	.32	.26	.26

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Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

**Copper** — The metal market had its ups and downs during November with the papers alternating between stories of agreement and disagreement in the negotiations of the international cartel. When the representatives of the Katanga sailed copper was quoted at 6½¢, the lowest figure ever known. This price was withdrawn, however, as cable advices from abroad announced adherence of Katanga to the original plan. The market closed at the end of the month at 6½—7c.

**Copper Sulfate** — With the metal quoted as low as 6½¢ with the break-up of the international meeting in New York, the salt went to \$3.10, a record low price. Some firming of prices may result with the announced acceptance of the proposed plan of curtailment by Belgium Katanga mining interests. U. S. Copper sulfate foreign trade during first 9 months of 1931 showed substantial gain in exports and deep cut in importations. Exports for first three quarters 1931 were 6,050,000 pounds, gain of 3,000,000 lbs. over corresponding period last year. British exports during same period fell to 75,200,000 pounds from 80,650,000. Growing importance of Germany is revealed in shipments of 16,900,000 pounds as contrasted with 15,750,000. U. S. imports of copper sulfate declined in first 9 months, 1931, to 1,850,000 lbs., a decrease of 2,400,000 lbs. from amount entered in corresponding months of 1930.

**Glycerine** — Despite the approach of anti-freeze business all grades of glycerine went to new low prices. While anti-freeze business to date has been disappointing, due to the unreasonably hot weather, the present decline cannot be attributed wholly to this situation. Large additions to present surplus stocks are blamed for the decline. U. S. production and trade in glycerin during comparable six months periods is shown in the following table:

	Nine Months, 1930	
	Pounds	Value
Import (general)		
Refined	1,870,380	\$162,831
Crude	7,647,960	445,220
Exports	505,222	86,592
Production		
Crude, 80% basis	105,666,956	
Dynamite glycerin	36,916,305	
Chemically pure	50,103,248	
Stocks—September 30		
Crude, 80% basis	15,234,884	
Dyna nite glycerin	10,902,352	
Chemically pure	7,830,756	
	Nine Months, 1931	
	Pounds	Value
Import (general)		
Refined	868,412	\$72,984
Crude	7,599,814	408,415
Exports	263,943	39,921
Production		
Crude, 80% basis	105,451,668	
Dynamite glycerin	31,012,535	
Chemically pure	54,168,296	
Stocks—September 30		
Crude, 80% basis	16,060,009	
Dynamite glycerin	10,948,773	
Chemically pure	11,795,166	

	Current Market	Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Dimethylsulfate, 100 lb dra. . . lb.	.45	.50	.45	.50	.45	.50	.45
Dinitrobenzene, 400 lb bbls. . . lb.	.15	.16	.15	.16	.15	.16	.15
Dinitrochlorobenzene, 400 lb bbls. . . lb.	.13	.15	.13	.15	.13	.15	.13
Dinitronaphthalene, 350 lb bbls. . . lb.	.34	.37	.34	.37	.34	.37	.34
Dinitrophenol, 350 lb bbls. . . lb.	.29	.30	.29	.30	.32	.31	.32
Dinitrotoluene, 300 lb bbls. . . lb.	.16	.17	.16	.17	.18	.19	.17
Diorthotolylguanidine, 275 lb bbls wks. . . lb.	.42	.46	.42	.46	.42	.49	.42
Dioxan (See Diethylene Oxide)							
Diphenyl. . . lb.	.20	.40	.20	.40	.20	.50	.40
Diphenylamine. . . lb.	.37	.38	.37	.38	.40	.38	.47
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.35	.30	.40
Dip Oil, 25%, drums. . . lb.	.26	.30	.26	.30	.30	.26	.30
Divi Divi pods, bgs shipmt. . ton	30.00	28.00	35.00	46.50	35.00	57.00	46.50
Extract. . . lb.	.05	.05	.05	.05	.05	.05	.05
Egg Yolk, 200 lb cases. . . lb.	.52	.45	.58	.80	.72	.84	.77
Epsom Salt, tech, 300 lb bbls c-1 NY. . . 100 lb	1.70	1.90	1.70	1.90	1.70	1.90	1.70
Ether, USP anaesthesia 55 lb. drs. . lb.	.23	.23	.28	.28	.21	.39	.38
USP (Conc.) . . lb.	.09	.10	.09	.10			
Ethyl Acetate, 85% Ester, . . tanks. . . lb.	.06	.07	.06	.088	.115	.085	.122
drums. . . lb.	.08	.09	.08	.10	.158	.094	.129
Anhydrous, tanks. . . lb.	.075	.075	.119	.142	.119		.111
drums. . . lb.	.085	.085	.121	.156	.115		
Acetoacetate, 50 gal drs. . . lb.	.65	.68	.65	.68	.65	.68	.65
Benzylaniline, 300 lb drs. . . lb.	.88	.90	.88	.90	1.11	.88	1.11
Bromide, tech, drums. . . lb.	.50	.55	.50	.55	.55	.55	.50
Carbonate, 90%, 50 gal dra gal.	1.85	1.90	1.85	1.90	1.85	1.90	1.85
Chloride, 200 lb. drums. . . lb.	.22	.22	.22	.22	.22	.22	.22
Chlorocarbonate, cbys. . . lb.	.30	.30	.30	.40	.30	.40	.35
Ether, Absolute, 50 gal drs. . lb.	.50	.52	.50	.52	.52	.50	.52
Furoate, 1 lb tins. . . lb.	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Lactate, drums works. . . lb.	.25	.29	.25	.29	.25	.35	.25
Methyl Ketone, 50 gal drs. . lb.	.30	.30	.30	.30	.30	.30	.30
Oxalate, drums works. . . lb.	.45	.55	.45	.55	.55	.45	.55
Oxybutyrate, 50 gal drs wks. lb.	.30	.30	.30	.30	.30	.36	.30
Ethylene Dibromide, 60 lb dr. lb.	.70	.70	.70	.70	.70	.70	.79
Chlorhydrin, 40%, 10 gal cbys. chloro. cont. . . lb.	.75	.85	.75	.85	.75	.85	.75
Dichloride, 50 gal drums. . lb.	.05	.07	.05	.07	.07	.05	.10
Glycol, 50 gal drs wks. . . lb.	.25	.28	.25	.28	.25	.30	.25
Mono Butyl Ether drs wks. . . lb.	.24	.24	.27	.27	.23	.31	.23
Mono Ethyl Ether drs wks. . lb.	.17	.20	.17	.20	.16	.24	.16
Mono Ethyl Ether Acetate dr. wks. . . lb.	.19	.23	.19	.23	.23	.19	.26
Mono Methyl Ether, drs. lb.	.21	.23	.21	.23	.23	.19	.23
Stearate. . . lb.	.18	.18	.18	.18			.19
Oxide, cyl. . . lb.	2.00	2.00	2.00	2.00	2.00		
Ethylidenaniline. . . lb.	.45	.47	.45	.47	.45	.65	.45
Feldspar, bulk. . . ton	15.00	20.00	15.00	20.00	25.00	15.00	20.00
Powdered, bulk works. . . ton	15.00	21.00	15.00	21.00	21.00	15.00	21.00
Ferrie Chloride, tech, crystal 475 lb bbls. . . lb.	.05	.07	.05	.07	.07	.05	.09
Fish Scrap, dried, wks. . unit	2.50	2.50	4.25	4.25	3.90	4.25	3.65
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis. . unit	2.40	2.50	3.50	3.50	3.20	4.00	3.50
Fluorspar, 98%, bags. . . unit	41.00	46.00	41.00	46.00	41.00	46.00	41.00
Formaldehyde							
Formaldehyd., aniline, 100 lb. drums. . . lb.	.37	.42	.37	.42	.37	.42	.37
USP, 400 lb bbls wks. . . lb.	.06	.07	.06	.07	.08	.06	.10
Fossil Flour. . . lb.	.02	.04	.02	.04	.04	.02	.04
Fullers Earth, bulk, mines. . ton	15.00	20.00	15.00	20.00	20.00	15.00	20.00
Imp powd -1 bags. . . ton	24.00	30.00	24.00	30.00	30.00	24.00	30.00
Furfural (tech.) drums, wks. lb.	.10	.10	.10	.15	.10	.19	.17
Furfuramide (tech) 100 lb dr. lb.	.30	.30	.30	.30	.30	.30	.30
Furfuryl Acetate, 1 lb tins. . lb.	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Alcohol, (tech) 100 lb dr. . lb.	.50	.50	.50	.50	.50	.50	.50
Furoic Acid (tech) 100 lb dr. . lb.	.50	.50	.50	.50	.50	1.00	.50
Fusel Oil, 10% impurities. . gal.	1.35	1.35	1.35	1.35	1.35	1.35	1.35
Fustic chips. . . lb.	.04	.05	.04	.05	.05	.04	.05
Crystals, 100 lb boxes. . . lb.	.18	.20	.18	.22	.20	.22	.20
Liquid, 50*, 600 lb bbls. . lb.	.07	.08	.07	.10	.10	.09	.10
Solid, 50 lb boxes. . . lb.	.14	.16	.14	.16	.16	.14	.16
Sticks. . . ton	25.00	26.00	25.00	26.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls. . lb.	.45	.50	.45	.50	.45	.52	.45
Gall Extract. . . lb.	.18	.20	.18	.20	.20	.18	.21
Gambier, common 200 lb cs. . lb.	.08	.07	.06	.07	.07	.06	.07
25% liquid, 450 lb bbls. . lb.	.08	.10	.08	.10	.10	.08	.14
Singapore cubes, 150 lb bg. . lb.	.09	.09	.09	.09	.09	.08	.09
Gelatin, tech, 100 lb cases. . lb.	.45	.50	.45	.50	.45	.50	.45
Glauber's Salt, tech, c-1 wks. . . 100 lb	1.00	1.70	1.00	1.70	1.70	1.00	1.70
Glucose (grape sugar) dry 70-80* bago c-1 NY. . . 100 lb	3.24	3.34	3.24	3.34	3.34	3.24	3.34
Tanner's Special, 100 lb bags. . . 100 lb	3.14	3.14	3.14	3.14	3.14	3.14	3.14
Glue, medium white, bbls. . lb.	.16	.20	.16	.24	.24	.20	.24
Pure white, bbls. . . lb.	.20	.25	.20	.26	.26	.22	.26
Glycerin, CP, 550 lb drs. . . lb.	.11	.11	.11	.14	.14	.12	.13
Dynamite, 100 lb drs. . . lb.	.09	.09	.09	.12	.12	.11	.12
Saponification, tanks. . . lb.	.06	.06	.06	.07	.08	.07	.08
Soap Lye, tanks. . . lb.	.04	.05	.04	.07	.07	.06	.07
Graphite, crude, 220 lb bgs. . ton	15.00	35.00	15.00	35.00	35.00	15.00	35.00
Flake, 50 lb bbls. . . lb.	.06	.09	.06	.09	.09	.06	.09
Gums							
Gum Accroides, Red, coarse and fine 140-150 lb bags. . . lb.	.33	.04	.03	.04	.03	.04	.03
Powd, 150 lb bags. . . lb.	.06	.06	.06	.06	.06	.06	.06

*Other*  
**NIACET**  
*Products*



ACETALDEHYDE  
PARALDEHYDE  
CROTONALDEHYDE  
ACETALDOL  
PARALDOL  
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# **PAY LESS FREIGHT**

You do not pay freight for transported water when you buy NIACET 99.5% GLACIAL ACETIC ACID. You receive full weight delivery of a water-white product without breakage or handling loss.

And if you want to use dilute acid, why not add the water at your plant? You can save as much as 15% on your net acid cost.

Why not try our service?

*Shipments Made In*

*Aluminum Tank Cars 65,000 Lbs.    Aluminum Drums 900 Lbs.  
Aluminum Cans 100 Lbs.    Glass Carboys (U. S. P.) 100 Lbs.*

## **Niacet Chemicals Corporation**

SALES OFFICE AND PLANT    NIAGARA FALLS, NEW YORK

### **Church & Dwight, Inc.**

*Established 1846*

80 MAIDEN LANE

NEW YORK

### **Bicarbonate of Soda**

### **Sal Soda**

### **Monohydrate of Soda**

*Standard Quality*

Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

**Methanol** — Record mild weather has prevented any large unusual demand for synthetic for anti-freeze purposes. With production down in all lines where methanol is used stocks have accumulated.

1931	Production	Crude Total
Jan.	522,656	392,060
Feb.	465,728	517,377
March	483,222	520,727
April	322,049	557,041
May	247,808	624,399
June	182,273	624,543
July	154,473	609,583
Aug. *	113,892	541,307
Sept. †	133,507	485,094

Totals, nine months . . . 2,625,608  
1930—Totals, nine months . . . 3,468,502

1931	Production	Shipments	Stocks, end of month
Jan.	306,373	167,309	444,119
Feb.	223,144	221,279	445,984
March	253,494	199,500	499,978
April	211,073	141,801	569,250
May	118,052	257,707	429,595
June	107,331	110,454	426,472
July	91,696	122,846	395,322
Aug. *	65,811	129,822	330,811
Sept. †	56,519	98,431	288,899

Tot. 9 mos. 1,432,993 1,449,149  
1930 9 mos 3,469,318 3,625,934

1931	Production	Shipments	Stocks, end of month
Jan.	769,553	510,703	1,354,890
Feb.	662,735	402,650	1,614,975
March	732,233	490,795	1,856,413
April	785,164	397,901	2,243,676
May	784,108	344,229	2,683,555
June	654,472	429,361	2,908,666
July	437,805	283,866	3,062,695
Aug. *	315,940	414,975	2,963,570
Sept. †	663,216	699,380	2,927,406

Tot. 9 mos. 5,805,226 3,973,860  
1930 9 mos 4,618,200 3,965,712

\*Revised. †Preliminary.

**Natural Dyestuffs** — The market for natural dyestuffs and tanning materials passed through another month of listlessness reflecting lack of confidence in any immediate pick-up in business and a desire to maintain inventories at lowest possible figure. Prices were generally lower. Exports of Jamaican dyewoods during third quarter of 1931 increased markedly to 5,197 long tons compared to 4,262 tons in the same 3-month period of 1930. Dyewood extracts were five times larger in the third quarter of 1931 (1,061 packages) compared to the third quarter of 1930 (193 packages).

**Potash** — It is thought that the majority of the business has now been placed for the coming fertilizer season. All orders for potash salts for agricultural purposes with specifications placed prior to December 1 for December, 1931, shipment were put through at a discount of 2 per cent. Orders placed on and after Dec. 1, 1931, for December, 1931, shipment and on all orders placed for Jan.-April, 1932, shipment, list prices without discount will apply.

**Rosin** — Domestic market not only held gains made in October, but practically all grades went to higher levels

	Current Market	Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Yellow, 150-200 lb bags . . . lb.	18	.20	.18	.20	.20	.18	.20
Anini (Zanzibar) bean & pea 250 lb cases . . . lb.	.35	.40	.35	.40	.40	.35	.40
Glassy, 250 lb cases . . . lb.	.50	.55	.50	.55	.55	.50	.55
Asphaltum, Barbadoes (Manjak) 200 lb bags . . . lb.	.04	.06	.04	.12	.12	.09	.12
Egyptian, 200 lb cases . . . lb.	.13	.15	.13	.17	.17	.15	.17
Gilsonite Selects, 200 lb bags . . . ton	30.50	32.90	30.50	32.90	32.90	30.50	32.90
Damar Batavia standard 136 lb cases . . . lb.	.09	.10	.09	.13	.20	.14	.22
Batavia Dust, 160 lb bags . . . lb.	.05	.05	.05	.06	.11	.06	.11
E Seeds, 136 lb cases . . . lb.	.06	.06	.07	.08	.13	.08	.17
F Splinters, 136 lb cases and bags . . . lb.	.05	.06	.06	.07	.13	.07	.13
Singapore, No 1, 224 lb cases lb.	.12	.12	.12	.15	.24	.18	.30
No. 2, 224 lb cases . . . lb.	.07	.07	.07	.10	.20	.13	.24
No. 3, 180 lb bags . . . lb.	.04	.05	.05	.06	.11	.07	.14
Benzoin Sumatra, U. S. P. 120 lb cases . . . lb.	.26	.28	.26	.34	.40	.33	.40
Copal Congo, 112 lb bags, clean opaque . . . lb.	.16	.17	.16	.17	.17	.16	.17
Dark, amber . . . lb.	.06	.07	.06	.07	.08	.07	.09
Light, amber . . . lb.	.12	.14	.12	.14	.14	.12	.14
Water white . . . lb.	.37	.45	.37	.45	.45	.37	.36
Mastic . . . lb.	.46	.47	.46	.58	.65	.57	.65
Manila, 180-190 lb baskets							
Loba A . . . lb.	.10	.11	.11	.13	.17	.13	.17
Loba B . . . lb.	.08	.08	.09	.10	.16	.13	.16
Loba C . . . lb.	.07	.08	.08	.10	.14	.10	.14
M A Sorts . . . lb.	.04	.05	.04	.06	.11	.09	.11
D B B Chips . . . lb.	.05	.06	.05	.08	.11	.09	.11
East Indies chips, 180 lb bags lb.	.05	.05	.05	.05	.11	.09	.11
Pale bold, 224 lb cs. . . lb.	.15	.16	.15	.16	.21	.17	.21
Pale nubs, 180 lb bags . . . lb.	.08	.08	.08	.09	.16	.12	.16
Pontianak, 224 lb cases . . . lb.	.15	.16	.16	.17	.21	.19	.23
Bold gen No 1 . . . lb.	.07	.08	.07	.08	.15	.13	.15
Gen chips spot . . . lb.	.09	.09	.10	.12	.14	.12	.14
Elemi, No. 1, 80-85 lb cs . . lb.	.08	.09	.09	.11	.13	.12	.13
No. 2, 80-85 lb cases . . . lb.	.08	.08	.08	.11	.13	.11	.13
No. 3, 80-85 lb cases . . . lb.	.43	.46	.42	.50	.57	.48	.50
Kauri, 224-226 lb cases No. 1	.28	.30	.24	.29	.38	.32	.38
No. 2 fair pale . . . lb.	.10	.12	.10	.12	.12	.10	.12
Brown Chips, 224-226 lb cases . . . lb.	.26	.28	.28	.34	.40	.38	.40
Bush Chips, 224-226 lb cases . . . lb.	.19	.21	.19	.22	.26	.24	.26
Pale Chips, 224-226 lb cases . . . lb.	.20	.18	.22	.40	.27	.72	.35
Sandarac, prime quality, 200 lb bags & 300 lb casks . . . lb.	25.00	.18	.14	25.00	25.00	25.00	.20
Helium, 1 lit. bot. . . . .	.14	.18	.14	.18	.14	.20	.14
Hematin crystals, 400 lb bbls lb.	.11	.11	.11	.11	.11	.11	.11
Paste, 500 bbls . . . lb.	.03	.03	.03	.03	.03	.03	.03
Hemlock 25%, 600 lb bbls wks lb.	16.00	.03	.03	16.00	16.00	16.00	17.00
Bark . . . lb.	.40	.50	.40	.60	.60	.60	.60
Hexalene, 50 gal drs wks . . lb.	.46	.47	.46	.50	.50	.46	.58
Hexamethylenetetramine, drs lb.	1.35	1.35	2.50	3.75	2.50	4.00	3.75
Hoof Meal, fob Chicago . . . unit	1.80	1.80	2.70	3.75	2.70	3.90	3.75
South Amer. to arrive . . . unit							
Hydrogen Peroxide, 100 vol, 140 lb cobs . . . lb.	.21	.24	.21	.24	.26	.21	.26
Hydroxylamine Hydrochloride lb.	3.15	.11	.11	3.15	3.15	.15	.12
Hypernic, 51%, 600 lb bbls . lb.	.11	.12	.11	.15	.12	.15	.12
Indigo Madras, bbls . . . lb.	1.25	1.30	1.25	1.30	1.30	1.28	1.30
20% paste, drums . . . lb.	.15	.18	.15	.18	.18	.15	.18
Synthetic, liquid . . . lb.	.12	.12	.12	.12	.12	.12	.12
Iron Chloride, see Ferric or Ferrous							
Iron Nitrate, kegs . . . lb.	.09	.10	.09	.10	.10	.09	.10
Coml, bbls . . . 100 lb.	2.50	3.25	2.50	3.25	2.50	3.25	2.50
Oxide, English . . . lb.	.10	.12	.10	.12	.10	.12	.10
Red, Spanish . . . lb.	.02	.03	.02	.03	.03	.02	.03
Isopropyl Acetate, 50 gal drs gal.	.85	.90	.85	.90	.85	.90	.85
Japan Wax, 224 lb cases . . . lb.	.09	.09	.07	.11	.15	.11	.18
Kieselguhr, 95 lb bgs NY . . . ton	60.00	70.00	60.00	70.00	70.00	60.00	70.00
Brown . . . 100 lb.	9.50	10.00	9.50	11.00	13.50	10.50	13.50
Lead Acetate, bbls wks . . . 100 lb.	10.50	11.00	10.50	12.25	14.50	11.50	14.50
White crystals, 500 lb bbls wks . . . 100 lb.	.10	.13	.10	.14	.16	.13	.15
Arsenate, drs 1c-1 wks . . . lb.	1.00	.13	.10	1.00	1.00	1.00	.13
Dithiofurate, 100 lb dr . . . lb.	3.85	3.75	4.60	7.75	5.10	7.75	6.10
Metal, c-1 NY . . . 100 lb.	.12	.14	.12	.14	.13	.14	.14
Nitrate, 500 lb bbls wks . . . lb.	.17	.18	.17	.18	.17	.18	.17
Oleate, bbls . . . lb.	.06	.07	.06	.08	.08	.08	.08
Oxide Litharge, 500 lb bbls lb.	.07	.08	.07	.08	.09	.08	.09
Red, 500 lb bbls wks . . . lb.	.07	.08	.07	.08	.09	.08	.09
White, 500 lb bbls wks . . . lb.	.07	.08	.07	.08	.09	.08	.09
Sulfate, 500 lb bbls wk . . . lb.	.06	.07	.06	.07	.08	.06	.08
Leuna salt petre, bags c.i.f. . . ton	Nom.	Nom.	Nom.	57.60	57.60	57.60	57.00
S. points c.i.f. . . . .	Nom.	Nom.	Nom.	57.90	57.90	57.90	57.30
Lime, ground stone bags . . . ton	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Live, 325 lb bbls wks . . . 100 lb.	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Lime Salts, see Calcium Salts							
Lime-Sulfur soln bbls . . . gal.	.15	.17	.15	.17	.17	.15	.17
Lithopone, 400 lb bbls 1c-1 wks . . . lb.	.04	.05	.04	.05	.05	.04	.05
Logwood, 51%, 600 lb bbls . . lb.	.07	.08	.07	.08	.08	.07	.08
Chips, 150 lb bags . . . lb.	.03	.03	.03	.03	.03	.03	.03
Solid, 50 lb boxes . . . lb.	.12	.12	.12	.12	.12	.12	.12
Sticks . . . ton	24.00	26.00	24.00	26.00	26.00	24.00	26.00
Lower grades . . . lb.	.07	.08	.07	.08	.08	.07	.08
Madder, Dutch . . . lb.	.22	.25	.22	.25	.25	.22	.25
Magnesite, calc, 500 lb bbl . . ton	50.00	60.00	50.00	60.00	60.00	50.00	60.00

# Ammonium Persulfate

# Potassium Persulfate

**JOSEPH TURNER & CO.**

**19 Cedar St.**



**New York City**

## Cellulose Acetate

*Uniformity and Stability*

## Acetic Anhydride

*90/95%*

## Anhydrous Sodium Acetate

## Cresylic Acid

*Pale 97/99%*

## Casein

*for all purposes*

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*Cellulose Acetate and Nitrocellulose  
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**Dibutyl Phthalate**

**Diethyl Phthalate**

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*Our Telephone numbers are Ashland 4-2265 and 2266 and 2229*

**AMERICAN-BRITISH CHEMICAL SUPPLIES**

**INCORPORATED**

**180 Madison Avenue**

**NEW YORK CITY**

Associated Companies: Chas. Tennant & Co., Ltd., Glasgow-Belfast-Dublin . . . . Barter Trading Corp., Ltd., London-Brussels

Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

sometime during the month. Some shading as the month closed tended to cancel part of the substantial gains. As yet, however, the naval stores industry is far from out of the woods, but with curtailed production now assured, the outlook is somewhat better. Market for naval stores in the French Landes district exhibited a firm tone during October. Last dip of gum will be completed end of December, and it is estimated that total crop of gum will be 16 per cent less than last year. Export prices for the month were: Turpentine, 315 francs per 100 kilos (\$0.392 per gallon); W. W. rosin, 104 francs per 100 kilos (\$4.29 per 280 pounds); F. G. grades, 80 francs per 100 kilos (\$3.30 per 280 pounds). Total exports of turpentine for September amounted to 792 metric tons, while rosin shipments aggregated 4,159 tons as compared with 791 tons of turpentine and 4,433 tons of rosin for September, 1930.

## Domestic Shipments

	October 1930	1931
Total naval stores, gums and resins.....	\$1,627,122	\$1,134,233
Rosin:—		
Gum rosin.....	88,415 bbls.	88,550
Gum rosin.....	\$829,249	\$544,745
Wood rosin.....	21,539 bbls.	12,398
Wood rosin.....	\$245,009	\$69,785
Gum sprs of turpentine	1,021,759 gals.	1,242,483
Gum sprs of turpentine	\$426,382	\$424,478
Wood turpentine.....	35,318 gals.	50,173
Wood turpentine.....	\$15,533	\$18,838
Tar and pitch of wood.	747 bbls.	445
Tar and pitch of wood.	\$6,392	\$4,009
Other gums and resins.	395,115 lbs.	346,045
Other gums and resins.	\$104,557	\$72,378

Ten Mos. Ended October  
1930 1931

Total naval stores, gums and resins.....	\$19,546,899	\$12,327,388
Rosin:—		
Gum rosin.....	909,138 bbls.	767,266
Gum rosin.....	\$10,463,939	\$6,078,203
Wood rosin.....	165,430 bbls.	124,596
Wood rosin.....	\$2,043,888	\$976,320
Gum sprs. of turpentine	11,780,579 gals.	10,057,761
Gum sprs. of turpentine	\$5,384,695	\$4,035,562
Wood turpentine.....	724,132	625,194
Wood turpentine.....	\$361,657	\$274,159
Tar and pitch of wood.	10,482	8,429
Tar and pitch of wood.	\$114,567	\$79,357
Other gums and resins.	4,427,921 lbs.	3,705,927
Other gums and resins.	\$1,178,153	\$883,787

**Sal Ammoniac** — Market showed no basic change and prices were firmly held. Of the September imports of 447,843 pounds of white material, United Kingdom shipped 17,360 pounds and Germany, 430,483 pounds. Germany shipped 120,261 pounds of the gray article in September.

**Saltcake** — With paper industry still operating on very restricted basis further accumulation of salt cake stocks led to price weakness. U. S. imports of salt cake during first six months of 1931 were 42,054 long tons valued at \$530,267. Imports for 1930 were 62,800 tons valued at \$800,432 against 81,816 tons worth \$829,793 for 1929. In first six months of 1931, imports by leading customs districts were Mobile, 11,640 long tons; Dakota, 8,880; Florida, 6,831, and New Orleans, 3,639.

	Current Market	Low	High	High	Low	High	Low
Magnesium							
Magnesium Carb, tech, 70 lb bags NY.....	.06	.06	.06	.06	.06	.06	.06
Chloride flake, 375 lb. drs o-l wks.....	35.00	36.00	35.00	36.00	36.00	36.00	36.00
Imported shipment.....	31.75	33.00	31.75	33.00	33.00	31.75	33.00
Fused, imp, 900 lb bbls NY ton.....	31.00	31.00	31.00	31.00	31.00	31.00	31.00
Fluosilicate, crys, 400 lb bbls wks.....	.10	.10	.10	.10	.10	.10	.10
Oxide, USP, light, 100 lb bbls lb.....	.42	.42	.42	.42	.42	.42	.42
Heavy, 250 lb bbls.....	.50	.50	.50	.50	.50	.50	.50
Peroxide, 100 lb cs.....	1.00	1.25	1.00	1.25	1.00	1.25	1.00
Silicofluoride, bbls.....	.09	.10	.09	.10	.09	.10	.09
Stearate, bbls.....	.24	.26	.24	.26	.25	.26	.25
Manganese Borate, 30%, 200 lb bbls.....	.19	.19	.19	.19	.19	.24	.19
Chloride, 600 lb casks.....	.07	.08	.07	.08	.07	.08	.08
Dioxide, tech (peroxide) drs lb.....	.03	.06	.03	.06	.03	.06	.04
Ore, Powdered or granular.....							
75-80%, bbls.....	.02	.03	.02	.03	.02	.03	.02
80-85%, bbls.....	.03	.03	.03	.03	.03	.04	.03
85-88%, bbls.....	.04	.04	.04	.04	.04	.05	.04
Sulfate, 550 lb drs NY.....	.07	.08	.07	.08	.07	.08	.07
Mangrove 55%, 400 lb bbls.....	.04	.03	.04	Nom.	.03	Nom.	.03
Bark, African.....	25.00	23.00	29.75	33.00	29.75	35.00	30.00
Marble Flour, bulk.....	14.00	14.00	15.00	15.00	14.00	15.00	14.00
Mercurous chloride.....	1.15	1.15	2.05	2.05	2.05	2.05	2.05
Mercury metal.....	64.00	68.00	64.00	106.00	124.50	106.00	126.00
Meta-nitro-aniline.....	.67	.69	.67	.69	.67	.74	.67
Meta-nitro-para-toluidine 200 lb bbls.....	1.40	1.55	1.40	1.55	1.50	1.55	1.50
Meta-phenylene-diamine 300 lb bbls.....	.80	.84	.80	.84	.80	.90	.80
Meta-toluene-diamine, 300 lb bbls.....	.67	.69	.67	.69	.67	.72	.67
Methanol							
Methanol, (Wood Alcohol).....							
95%.....	.33	.35	.33	.37	.48	.35	.65
97%.....	.34	.39	.34	.43	.49	.39	.65
Pure, Synthetic drums cars gal.....	.39	.41	.39	.42	.50	.42	.68
Synthetic tanks.....	.35	.35	.35	.40	.50	.40	.66
Methyl Acetate, drums.....	Nom.	Nom.	Nom.	Nom.	Nom.	Nom.	.95
Acetone.....	.50	.55	.50	.70	.77	.65	.85
Anthraquinone.....	.85	.95	.85	.95	.85	.95	.85
Cellosolve, (See Ethylene Glycol Mono Methyl Ether).....	.45	.45	.45	.45	.45	.60	.45
Chloride, 90 lb cyl.....	.50	.50	.50	.50	.50	.50	.50
Furoate, tech., 50 gal. dr., lb.....	65.00	80.00	65.00	80.00	80.00	65.00	80.00
Mica, dry grd. bags wks.....	110.00	115.00	110.00	115.00	110.00	115.00	110.00
Wet, ground, bags wks.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Michler's Ketone, kegs.....							
Mono-chlorobenzene, drums see, lb drums.....	3.75	4.00	3.75	4.00	4.00	3.75	4.20
Chlorobenzene, mono.....	.05	.07	.05	.07	.06	.07	.06
Monomethylparaminosulfate 100 lb drums.....	.03	.04	.03	.04	.03	.04	.03
Montan Wax, crude, bags.....	.05	.05	.05	.05	.05	.05	.05
Myrobalans 25%, liq bbls.....	34.00	35.00	34.00	35.00	41.00	34.00	43.00
50% Solid, 50 lb boxes.....	15.75	16.50	15.50	22.50	26.50	19.75	40.00
J1 bags.....	15.75	16.00	16.00	20.00	27.50	19.00	34.00
J2 bags.....							
R2 bags.....							
Naphtha, v. m. & p. (deodorized) bbls.....	.14	.16	.14	.18	.16	.18	.16
Naphthalene balln, 250 lb bbls wks.....	.03	.04	.03	.04	.05	.03	.05
Crushed, chipped bgs wks.....	.04	.04	.04	.04	.04	.04	.04
Flakes, 175 lb bbls wks.....	.03	.03	.03	.03	.05	.03	.05
Nickel Chloride, bbls kegs.....	.18	.20	.18	.21	.21	.20	.24
Oxide, 100 lb kegs NY.....	.37	.40	.37	.40	.40	.37	.40
Salt bbl. 400 bbls lb NY.....	.10	.13	.10	.13	.13	.10	.13
Single, 400 lb bbls NY.....	.10	.12	.10	.12	.13	.10	.13
Metal ingot.....	.35	.35	.35				
Nicotine, free 40%, 8 lb tins, cases.....	1.25	1.30	1.25	1.30	1.30	1.25	1.30
Sulfate, 10 lb tins.....	.98	1.20	.98	1.20	1.20	.98	1.20
Nitro Cake, bulk.....	12.00	14.00	12.00	14.00	18.00	12.00	18.00
Nitrobenzene, redistilled, 1000 lb drs wks.....	.09	.09	.09	.09	.09	.10	.09
Nitrocellulose, c-l-cl, wks.....	.25	.36	.25	.36	.36	.25	.36
Nitrogenous Material, bulk, unit.....	1.50	1.55	1.50	2.70	3.40	2.50	4.00
Nitronaphthalene, 550 lb bbls lb.....	.25	.25	.25	.25	.25	.25	.25
Nitrotoluene, 1000 lb drs wks lb.....	.14	.15	.14	.15	.15	.14	.15
Nutgalls Aleppy, bags.....	.18	.18	.18	.18	.16	.16	.16
Chinese, bags.....	.17	.18	.17	.18	.13	.12	.13
Oak Bark, ground.....	30.00	35.00	30.00	35.00	35.00	30.00	50.00
Whole.....	20.00	23.00	20.00	23.00	23.00	20.00	23.00
Orange-Mineral, 1100 lb casks NY.....	.10	.13	.10	.13	.13	.11	.13
Orthoaminophenol, 50 lb kgs.....	2.15	2.25	2.15	2.25	2.25	2.15	2.25
Orthoanisidine, 100 lb drs.....	2.50	2.60	2.50	2.60	2.60	2.50	2.60
Orthochlorophenol, drums.....	.50	.65	.50	.65	.65	.50	.65
Orthocresol, drums.....	.18	.22	.18	.25	.35	.18	.28
Orthodichlorobenzene, 1000 lb drums.....	.07	.10	.07	.10	.10	.07	.10
Orthonitrochlorobenzene, 1200 lb drs wks.....	.28	.29	.28	.33	.33	.30	.33
Orthonitrotoluene, 1000 lb drs wk.....	.16	.18	.16	.18	.18	.16	.18
Orthonitrophenol, 350 lb dr.....	.85	.90	.85	.90	.90	.85	.90
Orthotoluidine, 350 lb bbl 1e-1 lb.....	.28	.30	.28	.30	.30	.28	.30

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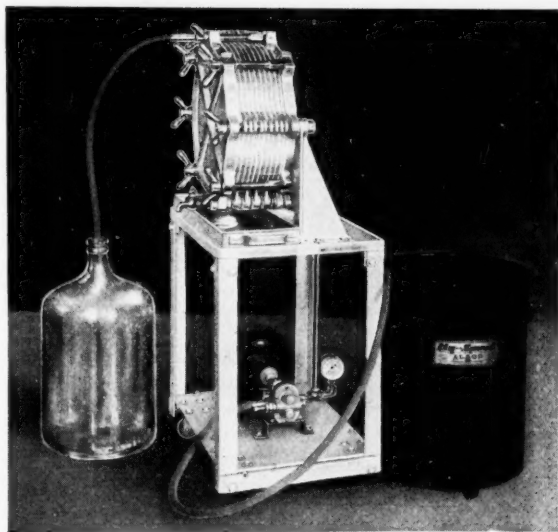
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Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

**Soda Ash** — After considerable delay producers announced a repetition of the present alkali prices for 1932. A fair amount of tonnage was booked in the last two weeks of the month and conditions in the market indicated firmness in the price structure. November shipments were smaller in number and volume when compared with October although some improvement was reported in the closing days of the month.

**Sodium Bicarbonate** — Producers report satisfactory rate of renewal of contracts. Of the September exports of 1,706,907 pounds, Canada received 984,726 pounds; Mexico, 83,504 pounds and Japan took 304,800 pounds.


**Soda Caustic** — Renewed activity occurred in the alkali field with the announcement of prices for 1932 at the present schedule. Spot purchases and actual shipments against present contracts were disappointing. Of the September exports of 11,168,495 pounds, Japan contracted 3,570,180 pounds; Philippine Islands, 450,962 pounds; Brazil, 1,567,200 pounds; Mexico, 1,350,610 pounds, and Canada, 1,294,469 pounds.

**Sodium Cyanide** — With plating and case-hardening operations greatly restricted shipments in November declined still further from the low reached in October. The U. S. exports of sodium cyanide during first 9 months of present year were 452 short tons, valued at \$130,530, compared with 436 short tons, valued at \$125,788, for the previous year. U. S. imports of this commodity were 7,192 short tons, valued at \$1,266,549, compared with 10,935, valued at \$1,656,456 for the same period of 1929.

**Superphosphate** — It appears that fertilizer demand this season will not run more than 60 or 70 per cent of last year's. This is well discounted, and overproduction and disappointments will be avoided. The surplus of cotton and reduced buying power in agricultural sections, as well as restricted credit, are all figured to cut down tonnage. The following new schedule was issued for the trade: 16 per cent stocks, in bulk; Carteret, N. J., \$8.25 per ton; Philadelphia, \$8.25 per ton; Baltimore \$8, and Norfolk, \$9. Prices for run-of-pile material are quoted on a phosphoric acid unit basis, as follows: Carteret, 48.44 cents; Philadelphia, 48.44 cents; Baltimore, 46.88 cents, and Norfolk, 53.125 cents per unit. As far as 16 per cent stocks are concerned, Baltimore f.o.b. basis, the market is unchanged. The South reports that superphosphate imports into U. S. during the three months ended September totaled 4,156 long tons, of which Cuba

	Current Market	Low	High	1931 High	1930 Low	1929 High	Low
Orthonitroparachlorphenol, tins	.70	.75	.70	.75	.75	.70	.75
Osage Orange, crystals . . . . . lb.	.16	.17	.16	.17	.17	.16	.17
51 deg. liquid . . . . . lb.	.07	.07	.07	.07	.07	.07	.07
Powdered, 100 lb bags . . . . . lb.	.14	.15	.14	.15	.15	.14	.15
Paraffin, retd, 200 lb cs slabs							
123-127 deg. M. P. . . . . lb.	.03	.03	.03	.04	.03	.06	.04
128-132 deg. M. P. . . . . lb.	.03	.03	.03	.06	.03	.07	.04
133-137 deg. M. P. . . . . lb.	.04	.04	.04	.07	.04	.07	.06
Para Aldehyde, 110-55 gal drs. lb.	.20	.23	.20	.23	.20	.28	.20
Aminoacetanilid, 100 lb bg. lb.	.52	.60	.52	.60	1.05	1.05	1.00
Aminohydrochloride, 100 lb kegs	1.25	1.30	1.25	1.30	1.30	1.30	1.25
Aminophenol, 100 lb keg. . . . . lb.	.82	.84	.82	.86	1.02	.92	1.15
Chlorophenol, drums . . . . . lb.	.50	.65	.50	.65	.65	.65	.50
Coumarone, 330 lb drums . . . . . lb.							
Cymene, retd, 110 gal dr. gal.	2.25	2.50	2.25	2.50	2.50	2.25	2.25
Dichlorobenzene, 150 lb bbls wks	.15	.16	.15	.20	.20	.17	.17
Nitroacetanilid, 300 lb bbls lb.	.45	.52	.45	.55	.55	.50	.55
Nitroaniline, 300 lb bbls wks	.48	.55	.48	.55	.55	.48	.48
Nitrochlorobenzene, 1200 lb drs wks	.23	.26	.23	.26	.26	.23	.26
Nitro-orthotoluidine, 300 lb bbls	2.75	2.85	2.75	2.85	2.85	2.75	2.75
Nitrophenol 185 lb bbls . . . . . lb.	.45	.50	.45	.50	.50	.45	.45
Nitrosodimethylaniline, 120 lb bbls	.92	.94	.92	.94	.94	.92	.94
Nitrotoluene, 350 lb bbls . . . . . lb.	.29	.31	.29	.31	.31	.29	.29
Phenylenediamine, 350 lb bbls	1.15	1.20	1.15	1.20	1.20	1.15	1.15
Tolueneulfonamide, 175 lb bbls	.70	.75	.70	.75	.75	.70	.70
Tolueneulfonchloride, 410 lb bbls wks	.20	.22	.20	.22	.22	.20	.20
Toluidine, 350 lb bbls wk. . . . . lb.	.42	.43	.40	.44	.40	.38	.38
Paris Green, Arsenic Basis 100 lb kegs	.27	.27	.27	.27	.27	.27	.25
250 lb kegs . . . . . lb.	.26	.25	.26	.25	.25	.25	.23
Persian Berry Ext., bbls . . . . . lb.	.25	Nom.	.25	Nom.	Nom.	.25	.25
Pentanol (see Alcohol, Amyl) . . . . .							
Pentanol Acetate (see Amyl Acetate) . . . . .							
Petrolatum, Green, 300 lb bbl lb.	.02	.02	.02	.02	.02	.02	.02
Phenol, 250-100 lb drums . . . . . lb.	.14	.15	.14	.15	.15	.14	.13
Phenyl - Alpha - Naphthylamine, 100 lb kegs	1.35	1.35	1.35	1.35	1.35	1.35	1.35
Phenylhydrazine Hydrochloride . . . . . lb.	2.90	3.00	2.90	3.00	3.00	2.90	
<b>Phosphate</b>							
Phosphate Acid (see Superphosphate)							
Phosphate Rock, f.o.b. mines							
Florida Pebble, 68% basis . . . . . ton	3.10	3.25	3.10	3.25	3.15	3.00	3.15
70% basis . . . . . ton	3.75	3.90	3.75	3.90	4.00	3.75	4.00
72% basis . . . . . ton	4.25	4.35	4.25	4.35	4.50	4.25	4.50
75-74% basis . . . . . ton	5.25	5.50	5.25	5.50	5.50	5.25	5.50
75% basis . . . . . ton	5.75	5.75	5.75	5.75	5.75	5.75	5.75
77-80% basis . . . . . ton	6.25	6.25	6.25	6.25	6.25	6.25	6.25
Tennessee, 72% basis . . . . . ton	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Phosphorous Oxide 175 lb cyl.	.18	.20	.18	.20	.25	.18	.20
Red, 110 lb cases . . . . . lb.	.43	.46	.42	.46	.42	.37	.40
Yellow, 110 lb cases wks . . . . . lb.	.31	.37	.31	.37	.37	.31	.32
Sesquioxide, 100 lb cs . . . . . lb.	.38	.44	.38	.44	.44	.44	.44
Trichloride, cylinders . . . . . lb.	.18	.20	.18	.20	.25	.18	.35
Phthalic Anhydride, 100 lb bbls wks	.15	.16	.15	.16	.20	.15	.20
Pigments Metallic, Red or brown bags, bbls, Pa. wks . . . . . ton	37.00	45.00	37.00	45.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls	.61	.63	.61	.64	.64	.63	.63
Destructive dist. . . . . lb.	8.00	10.60	8.00	10.60	10.60	8.00	10.60
Prime bbls . . . . . bbl.	.54	.61	.54	.70	.70	.65	.70
Steam dist. bbls . . . . . gal.							
Pitch Hardwood . . . . . ton	35.00	45.00	35.00	45.00	45.00	35.00	45.00
Plaster Paris, tech, 250 lb bbls	3.30	3.50	3.30	3.50	3.50	3.30	3.30
Platinum, Refined . . . . . oz.	38.00	38.00	38.00				
<b>Potash</b>							
Potash, Caustic, wks, solid . . . . . lb.	.06	.06	.06	.06	.06	.07	.06
flake . . . . . lb.	.0705	.08	.0705	.08	.08	.0705	.0705
Potash Salts, Rough Kainit							
12.4% basis bulk . . . . . ton	9.20	9.20	9.20	9.20	9.10	9.10	9.00
14% basis . . . . . ton	9.70	9.70	9.70	9.70	9.60	9.60	9.50
Manure Salts . . . . . ton							
20% basis bulk . . . . . ton	12.65	12.65	12.65	12.65	12.50	12.50	12.40
30% basis bulk . . . . . ton	19.15	19.15	19.15	19.15	18.95	18.95	18.75
Potassium Acetate . . . . . lb.	.27	.28	.27	.30	.30	.27	
Potassium Muriate, 80% basis bags . . . . . ton	37.15	37.15	37.15	37.15	36.75	36.75	36.40
Pot. & Mag. Sulfate, 48% basis bags . . . . . ton	27.80	27.80	27.80	27.80	27.50	27.50	27.00
Potassium Sulfate, 90% basis bags . . . . . ton	48.25	48.25	48.25	48.25	47.75	47.75	47.30
Potassium Bicarbonate, USP, 320 lb bbls . . . . . lb.	.07	.09	.07	.10	.10	.09	.09
Bichromate Crystals, 725 lb casks . . . . . lb.	.08	.09	.08	.09	.09	.08	.09
Powd., 725 lb cks wks . . . . . lb.	.13	.13	.13	.13	.13	.13	.13

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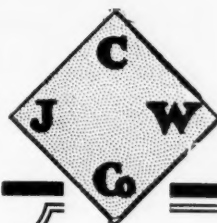
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1857



1931

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supplied 3,000 tons and Japan 1,156. All of the Cuban material was entered in Porto Rico, while receipts from Japan were distributed in the following customs districts: San Diego, 25 tons; Los Angeles, 355; San Francisco, 22; Washington, 546; and Hawaii, 208 tons. Superphosphate was not separately listed in official import statistics previous to July 1, 1931.

## Production Figures

1931	Bulk superphosphate		
	Total U. S.	Northern district	Southern district
Jan.....	349,610	187,116	162,494
Feb.....	292,970	164,272	128,698
March....	277,803	182,562	95,241
April.....	244,931	156,201	88,730
May.....	224,266	137,320	86,946
June.....	178,072	129,324	48,748
July.....	195,589	121,382	74,207
Aug.*....	210,289	123,943	86,346
Sept.**...	173,271	89,023	84,248
Totals, 9 mos....	2,146,801	1,291,143	855,658
1930			
Jan.....	479,169	203,093	276,076
Feb.....	397,638	191,747	205,891
March....	379,764	205,990	173,774
April.....	392,705	194,630	198,075
May.....	389,412	199,755	189,657
June.....	355,761	199,102	156,659
July.....	374,059	197,861	176,198
August...	340,027	177,931	162,096
Sept.....	332,135	150,655	181,480
Totals, 9 mos....	3,440,670	1,720,764	1,719,906
Oct.....	395,246	175,957	219,289
Nov.....	367,141	172,043	195,098
Dec.....	392,039	206,328	185,711
Totals, year...	4,595,096	2,275,092	2,320,004
Totals, 1929...	4,342,012	2,195,726	2,146,286

\*Revised. \*\*Preliminary.

**Synthetic Dyes** — Consumers were hesitant about placing orders for quantities other than that required for immediate needs. Both the textile and tanning industries were operating at much lower schedules than those prevailing two months ago.

## Imports of Synthetic Dyes

	1931		1930	
	Lbs.	\$	Lbs.	\$
Jan....	181,775	\$159,482	295,106	\$241,310
Feb....	452,477	374,511	379,102	329,302
March..	218,844	208,333	466,257	399,420
April..	502,248	435,848	384,424	312,158
May....	675,058	576,332	307,500	265,434
June...	399,213	359,117	363,166	291,793
July...	356,106	307,350	151,233	131,511
Aug....	454,165	395,620	464,678	399,284
Sept...	462,346	427,343	335,262	292,314
Oct....	371,392	329,178	324,902	282,846
10 mos.	4,073,624	\$3,573,114	3,471,630	\$2,945,372

**Zinc** — The market for the metal passed through another quiet period. Some improvement naturally followed the rise in commodity markets in the early part of the month but slumped with the turn again to pessimistic sentiments in the middle week. World output of zinc in October was 84,344 short tons, compared with 84,448 in September and 128,186 in October, 1930, the American Institute of Metal Statistics states. Following table gives in short tons production of slab zinc for the world, unallocated as to origin of ore except in the case of

	Current Market	Low	High	1931 High	1930 High	Low	High	1929 Low
Binoxalate, 300 lb bbls....lb.	.14	.17	.14	.17	.17	.14	.17	.14
Bisulfate, 100 lb kegs....lb.	.16	.30	.16	.30	.30	.30	.30	.30
Carbonate, 80-85% calc. 800 lb casks....lb.	.04½	.05	.04½	.07½	.05½	.05½	.05½	.05½
Chlorate crystals, powder 112 lb keg wks....lb.	.08	.08½	.08	.08½	.09	.08	.09	.08½
Chloride, crys bbls....lb.	.04	.04½	.04	.06	.06	.05½	.05½	.05½
Chromate, kegs....lb.	.23	.28	.23	.28	.28	.23	.28	.23
Cyanide, 110 lb. casks....lb.	.55	.57½	.55	.57½	.57½	.55	.57½	.55
Metabisulfate, 300 lb. bbl....lb.	.11	.13	.11	.13	.13	.12	.13	.11
Oxalate, bbls....lb.	.20	.24	.20	.24	.24	.20	.24	.16
Perchlorate, casks wks....lb.	.09	.11	.09	.12	.12	.11	.12	.11
Permanganate, USP, crys 500 & 100 lb drs wks....lb.	.16	.16½	.16	.16½	.16	.16	.16½	.16
Prussiate, red, 112 lb keg....lb.	.35	.37	.35	.40	.40	.38	.40	.38
Yellow, 500 lb casks....lb.	.18½	.21	.18½	.21	.21	.18½	.21	.18½
Tartrate Neut, 100 lb keg....lb.	.21	.21	.21	.21	.21	.21	.21	.21
Titanium Oxalate, 200 lb bbls....lb.	.21	.23	.21	.23	.23	.21	.25	.21
Propyl Furoate, 1 lb tins....lb.	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Pumice Stone, lump bags....lb.	.04	.05	.04	.05	.05	.04	.05	.04
250 lb bbls....lb.	.04½	.06	.04½	.06	.06	.04½	.06	.04½
Powdered, 350 lb bags....lb.	.02½	.03	.02½	.03	.03	.02½	.03	.02½
Putty, commercial, tubs....100 lb.	2.35	2.45	2.35	2.45	.03½	.03½	.03½	.03½
Linseed Oil, kegs....100 lb.	4.00	4.75	4.00	4.75	.05½	.05½	.05½	.05½
Pyridine, 50 gal drums....gal.	1.50	1.75	1.50	1.75	1.75	1.50	1.75	1.50
Pyrites, Spanish cif Atlantic ports bulk....unit	.12	.13	.12	.13½	.13½	.13	.13½	.13
Quebracho, 35% liquid tks....lb.	.02½	.03	.02½	.04	.04	.02½	.04	.03
450 lb bbls c-1....lb.	.03½	.03½	.03½	.03½	.03½	.03½	.04	.03½
35% Bleaching, 450 lb bbl....lb.	.04	.05½	.04	.05	.04	.05	.04	.05
Solid, 63%, 100 lb bales cif....lb.	.02½	.02½	.05	.05	.05	.05	.05	.05
Clarified, 64%, bales....lb.	.03	.03	.05	.05	.05	.05	.05	.05
Quercitron, 51 deg liquid 450 lb bbls....lb.	.05½	.06	.05½	.06	.06	.05½	.06	.05½
Solid, 100 lb boxes....lb.	.09½	.13	.09½	.13	.13	.09½	.13	.10
Bark, Rough....ton	34.00	35.00	34.00	35.00	35.00	34.00	35.00	34.00
Ground....ton	34.00	35.00	34.00	35.00	35.00	34.00	35.00	34.00
R Salt, 250 lb bbls wks....lb.	.40	.44	.40	.44	.45	.40	.46	.44
Red Sanders Wood, grd bbls....lb.	.18	.18	.18	.18	.18	.18	.18	.18
Resorcinol Tech, cans....lb.	.65	.70	.65	1.25	1.25	.90	1.25	1.15
Rosin Oil, 50 gal bbls, first run....gal.	.47	.47	.58	.58	.56	.62	.57	.57
Second run....gal.	.51	.51	.61	.61	.59	.64	.60	.60

## Rosin

Rosins 600 lb bbls 280 lb...unit ex. yard N. Y.

B.....	3.85	3.75	4.95	7.75	5.35	9.25	7.45
D.....	3.95	3.80	5.50	8.00	5.50	9.25	7.70
E.....	4.03½	3.90	5.90	8.17	5.52½	9.27	8.30
F.....	4.05	3.95	6.20	8.45	5.55	9.27	8.40
G.....	4.07½	4.00	6.25	8.45	5.60	9.45	8.40
H.....	4.10	4.02½	6.30	8.55	5.60	9.50	8.40
I.....	4.05	4.15	6.35	8.58	5.62½	9.50	8.40
K.....	4.10	4.40	6.45	8.65	5.62½	9.55	8.45
M.....	4.70	4.20	6.70	8.80	5.65	9.85	8.50
N.....	5.85	4.85	6.95	8.95	6.05	10.30	8.93
WG.....	7.10	6.15	8.15	9.25	6.85	11.30	9.00
WW.....	7.55	6.45	8.90	9.85	7.85	12.30	9.30
Rotten Stone, bags mines....ton	24.00	20.00	24.00	20.00	18.00	30.00	24.00
Lump, imported, bbls....lb.	.05	.07	.05	.07	.05	.08	.05
Selected bbls....lb.	.09	.12	.09	.12	.09	.12	.09
Powdered, bbls....lb.	.02	.05	.02	.05	.02	.05	.02
Sago Flour, 150 lb bags....lb.	.04½	.05	.04½	.05	.04½	.05	.04½
Sal Soda, bbls wks....100 lb.	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Salt Cake, 94-96% o-1 wks....ton	14.00	15.50	14.00	19.00	24.00	15.50	24.00
Chrome....ton	13.00	14.50	13.00	17.00	25.00	14.50	21.00
Saltpetre, double reid granular 450-500 lb bbls....lb.	.06½	.06½	.06	.06½	.06½	.06½	.06½
Satin, White, 500 lb bbls....lb.	.01½	.01½	.01½	.01½	.01½	.01½	.01½
Shellac Bone dry bbls....lb.	.26	.28	.26	.29	.28	.26	.29
Garnet, bags....lb.	.19	.20	.19	.26	.24	.24	.26
Superfine, bags....lb.	.17½	.17½	.22	.39	.20	.27	.39
T. N. bags....lb.	.14½	.16	.14½	.17	.34	.18	.44
Schaeffer's Salt, kgs....lb.	.53	.57	.53	.57	.53	.57	.53
Silica, Crude, bulk mines....ton	8.00	11.00	8.00	11.00	8.00	11.00	8.00
Refined, floated bags....ton	22.00	30.00	22.00	30.00	30.00	30.00	22.00
Air floated bags....ton	32.00	32.00	32.00	32.00	32.00	32.00	32.00
Extra floated bags....ton	32.00	40.00	32.00	40.00	40.00	40.00	32.00
Soapstone, Powdered, bags f. o. b. mines....ton	15.00	22.00	15.00	22.00	22.00	15.00	22.00

## Soda

Soda Ash, 58% dense, bags c-1 wks.....100 lb.	1.17½	1.17½	1.40	1.40	1.40	1.40		
58% light, bags.....100 lb.	1.15	1.15	1.34½	1.34½	1.34½	1.34½		
Contract, bags c-1 wks.....100 lb.	1.15	1.15	1.32	1.32	1.32	1.32		
Soda Caustic, 76% grnd & flake drums.....100 lb.	2.90	2.90	3.35	3.00	3.35	3.35		
76% solid drs.....100 lb.	2.50	2.50	2.95	2.90	2.95	2.95		
Sodium Acetate, tech.....450 lb. bbls wks.....lb.	.04½	.05	.04½	.06	.05½	.04	.06½	.04½
Arsenate, drums.....lb.	.25	.35	.25	.35	.19	.18	.19	.18
Arsenite, drums.....gal.	.50	.75	.50	.75	1.00	.50	1.50	.75
Bioarb, 400 lb bbl.....100 lb.	2.25	2.35	2.35	2.41	2.41	2.41	2.41	2.41

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Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

United States and Mexico. Zinc produced in United States from Mexican ore is credited to Mexico.

	Sept.	Oct.	Jan.-Oct.
United States...	21,356	21,674	258,582
Mexico.....	2,875	2,809	32,777
Canada.....	9,797	8,399	104,575
*Belgium.....	11,990	12,410	128,589
France.....	4,980	5,136	58,995
*Germany.....	4,183	4,437	43,246
Italy.....	1,193	617	14,198
Netherlands...	1,587	1,653	18,238
*Poland.....	10,155	10,859	133,250
Spain.....	914	914	9,405
Anglo-Australian	6,318	6,436	69,931
Rhodesia.....			7,696
†Elsewhere.....	9,100	9,000	89,000
World's total...	84,448	84,344	968,482
United States...	21,356	21,674	258,582
Elsewhere.....	63,092	62,670	709,900

\*Includes saleable zinc dust. †Partly estimated; includes Norway, Yugoslavia, Czechoslovakia, Russia, Indo-China and Japan.

Daily average of world zinc production in October was 2,721 tons, compared with 2,815 in September, 2,766 in August and 4,135 in October, 1930.

## OILS AND FATS

Market for fats and oils passed through fairly exciting month with prices showing a decided inclination to rise in the early part of the month in sympathy with the general rise in commodity markets, improvement in silver and the generally better tone. With the turn in prices in grain and silver, declines were registered and with few exceptions most of the early gains wiped out. In many instances, the final prices were net losses for the 30 day period. In the last two weeks of the month forward buying disappeared and such orders as were placed, were small, and for immediate shipment. One important price change was in castor oil where reductions were announced, the first to occur in several months. The Department of Commerce announces that according to census returns the factory production of fats and oils (exclusive of refined oils and derivatives) during the three-month period ended September 30, 1931, was as follows: vegetable oils, 440,864,880 pounds; fish oils, 29,847,113 pounds; animal fats, 491,837,395 pounds; and greases, 90,055,631 pounds; a total of 1,052,605,019 pounds. Of the several kinds of fats and oils covered by this inquiry, the largest production, 341,821,438 pounds appears for lard. Next in order is cottonseed oil with 160,983,737 pounds; tallow with 149,227,001 pounds; linseed oil with 141,204,905 pounds; coconut oil with 61,387,627 pounds; corn oil with 25,291,850 pounds; and sesame oil with 23,839,876 pounds. The produc-

	Current Market	Low	1931 High	High	1930 Low	High	1929 Low	Low
Bichromate, 500 lb cks wks. lb.	.06½	.07	.06½	.07½	.07½	.07	.07½	.07
Bisulfite, 500 lb bbl wks. lb.	.04	.04	.04	.04	.04	.04	.04	.04
Chlorate, . . . . . lb.	.05½	.07½	.05½	.07½	.08	.05½	.11	.06½
Chloride, technical, . . . . . ton	12.00	13.00	12.00	13.00	13.00	12.00	13.00	12.00
Cyanide, 98-98%, 100 & 250 lb drums wks. . . . . lb.	.16	.17	.16	.17	.20	.16	.20	.18
Fluoride, 300 lb bbls wks. . . . lb.	.07	.07½	.07	.08½	.09	.08½	.09	.08½
Hydroxide, 200 lb bbls f. o. b. wks. . . . . lb.	.22	.24	.22	.24	.24	.22	.24	.22
Hypochlorite solution, 100 lb cbye. . . . . lb.	.05	.05	.05	.05	.05	.05	.05	.05
Hyposulfite, tech, pea cys. 375 lb bbls wks. . . . . lb.	2.40	3.00	2.40	3.00	3.00	2.40	3.05	2.50
Technical, regular crystals 375 lb bbls wks. . . . . lb.	2.40	2.65	2.40	2.65	2.65	2.50	2.65	2.40
Metanilate, 150 lb bbls. . . . lb.	.44	.45	.44	.45	.45	.44	.45	.45
Metasilicate, c-l, wks. . . . . lb.	4.00	.02½	.02	4.00	.02½	.02½	.02½	.02½
Monohydrate, bbls. . . . . lb.	.52	.54	.52	.54	.57	.52	.57	.54
Naphthionate, 300 lb bbl. . . lb.	1.73½	1.73½	2.07	2.22½	1.99	2.22½	2.09	.07½
Nitrate, 92%, crude, 200 lb bags c-l NY. . . . . lb.	.07½	.08	.07½	.08	.07½	.08	.07½	.07½
Nitrite, 500 lb bbls spot. . . lb.	.25	.27	.25	.27	.25	.27	.25	.25
Orthochlorotoluene, sulfonate, 175 lb bbls wks. . . . . lb.	.18	.20	.18	.20	.18	.22	.18	.18
Perborate, 275 lb bbls. . . . lb.	2.50	3.00	2.50	3.00	3.25	2.65	3.55	3.25
Phosphate, di-sodium, tech. 310 lb bbls. . . . . lb.	3.20	3.15	3.50	4.00	3.25	4.00	3.90	.69
Picramate, 100 lb kegs. . . . lb.	.69	.72	.69	.72	.69	.72	.69	.69
Prussiate, Yellow, 350 lb bbl wks. . . . . lb.	.11½	.12	.11½	.12	.11½	.12½	.12	.12
Pyrophosphate, 100 lb keg. . lb.	.15	.20	.15	.20	.15	.20	.15	.15
Silicate, 60 deg 55 gal drs, wks 100 lb. . . . . lb.	1.65	1.70	1.65	1.70	1.70	1.6	1.70	1.65
40 deg 55 gal drs, wks 100 lb. . . . . lb.	.75	.75	1.00	.80	.70	.80	.70	.70
Silicofluoride, 450 lb bbls NY. . lb.	.04½	.04½	.04	.04½	.04	.05½	.05	.05
Stannate, 100 lb drums. . . lb.	.19	.21	.19	.26	.43	.24	.43	.38
Stearate, bbls. . . . . lb.	.20	.25	.20	.25	.29	.20	.29	.25
Sulfanilate, 400 lb bbls. . . lb.	.16	.18	.16	.18	.18	.16	.18	.16
Sulfate Anhyd, 550 lb bbls c-l wks. . . . . lb.	.02	.02½	.02	.02½	.02½	.02½	.02½	.02½
Sulfide, 80% crystals, 440 lb bbls wks. . . . . lb.	.02½	.02½	.02½	.02½	.02½	.02½	.02½	.02½
62% solid, 650 lb drums 10-l wks. . . . . lb.	.03	.03½	.03	.03½	.03½	.03	.04	.03½
Sulfite, crystals, 400 lb bbls wks. . . . . lb.	.03	.03½	.03	.03½	.03½	.03	.03½	.03
Sulfoeyanide, bbls. . . . . lb.	.28	.35	.28	.35	.35	.28	.76	.28½
Tungstate, tech, crystals, kegs. . lb.	.80	.88	.80	.88	.88	.81	1.40	.88
Solvent Naphtha, tanks. . . . wks. . . . . gal.	.26	.28	.24	.38	.40	.30	.40	.35
Spruce, 25% liquid, bbls. . . lb.	.01	.01	.01½	.01½	.01½	.01½	.01½	.01½
25% liquid, tanks wks. . . lb.	.01	.01	.01	.01	.01	.01	.01	.01
50% powd, 100 lb bag wks lb.	.02	.02½	.02	.02½	.02½	.02	.02½	.02
Starch, powd., 140 lb bags 100 lb. . . . . lb.	2.57	2.57	3.20	4.02	3.42	4.12	3.82	
Pearl, 140 lb bags. . . . . lb.	2.77	2.77	3.00	3.92	3.32	4.02	3.72	
Potato, 200 lb bags. . . . . lb.	.05½	.06	.05½	.06	.06½	.05½	.06½	.05½
Imported bags. . . . . lb.	.05½	.06½	.05½	.06½	.06½	.05½	.06½	.05½
Soluble. . . . . lb.	.08	.08½	.08	.08½	.08½	.08	.08½	.08
Rice, 200 lb bbls. . . . . lb.	.09	.10	.09	.10	.09	.10	.09	.09
Wheat, thick bags. . . . . lb.	.06½	.07	.06½	.07	.06½	.07	.06½	.06½
Thin bags. . . . . lb.	.09½	.10	.09½	.10	.09½	.10	.09½	.09½
Strontium carbonate, 600 lb bbls wks. . . . . lb.	.07½	.07½	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY. . . lb.	.07	.07½	.07	.09½	.09½	.09	.09½	.08½
Peroxide, 100 lb drs. . . . . lb.	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

## Sulfur

Sulfur Brimstone, broken rock, 250 lb bag c-l. . . . . 100 lb.	2.05	19.00	18.00	2.05	2.05	2.05	2.05	2.05
Crude, f. o. b. mines. . . . . ton	18.00	19.00	18.00	19.00	19.00	18.00	19.00	18.00
Flour for dusting 99½%, 100 lb bags c-l NY. . . . . 100 lb.	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
Heavy bags c-l. . . . . 100 lb.	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Flowers, 100%, 155 lb bbls c-l NY. . . . . 100 lb.	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45
Roll, bbls 10-l NY. . . . . 100 lb.	2.65	2.85	2.65	2.85	2.85	2.65	2.85	2.65
Sulfur Chloride, red, 700 lb drs wks. . . . . lb.	.05	.05½	.05	.05½	.05	.05½	.05	.05
Yellow, 700 lb drs wks. . . . lb.	.03½	.04	.03½	.04	.03½	.04	.03½	.03½
Sulfur Dioxide, 150 lb cyl. . . lb.	.07	.07½	.07	.07½	.07	.07½	.07	.07
Extra, dry, 100 lb cyl. . . . lb.	.10	.12	.10	.12	.10	.19	.10	.10
Sulfuryl Chloride. . . . . lb.	.15	.40	.15	.40	.65	.10	.65	.10
Talc, Crude, 100 lb bgs NY. . . ton	12.00	15.00	12.00	15.00	15.00	12.00	15.00	12.00
Refined, 100 lb bgs NY. . . ton	16.00	18.00	16.00	18.00	18.00	16.00	18.00	16.00
French, 220 lb bags NY. . . ton	18.00	22.00	18.00	22.00	22.00	18.00	25.00	18.00
Refined, white, bags. . . . ton	35.00	40.00	35.00	40.00	40.00	35.00	45.00	35.00
Italian, 220 lb bags NY. . . ton	40.00	50.00	40.00	50.00	50.00	40.00	50.00	40.00
Refined, white, bags. . . . ton	50.00	55.00	50.00	55.00	55.00	50.00	55.00	50.00
Superphosphate, 16% bulk, wks. . . . . ton	8.00	7.50	9.00	9.50	8.00	10.00	9.00	
Triple bulk, wks. . . . . unit	.65	.65	.65	.65	.65	.65	.65	
Tankage Ground NY. . . . . unit	1.50&10	1.50	3.20&10	4.00&10	3.20&10	4.50&10	4.00&10	
High grade f.o.b. Chicago. unit	1.50&10	1.50	3.25&10	3.85&10	3.25&10	4.80&10	3.75&10	
South American oil. . . . . unit	2.25&10	2.00	3.40&10	4.25&10	3.40&10	4.80&10	4.35&10	
Tapioca Flour, high grade bgs. lb.	.03½	.05	.03½	.05	.05	.03	.05½	.04
Medium grade, bags. . . . lb.	.03	.04	.03	.04	.04	.02½	.04	.03
Tar Acid Oil, 15% drums. . . gal.	.24	.25	.24	.25	.24	.27	.24	.26
25% drums. . . . . gal.	.26	.28	.26	.28	.30	.26	.30	.29

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PHOSPHATES**  
Brilliant, Colorless Crystals

Use Bowker's Trisodium Phosphate for all industrial purposes. Crystals are of uniform size and sparkling white appearance.

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Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

tion of refined oils during the period was as follows: Cottonseed, 91,966,959 pounds; coconut, 68,682,102 pounds; peanut, 2,096,240 pounds; corn, 21,807,440 pounds; soya bean, 8,667,208 pounds; and palm-kernel, 6,170,308 pounds. The quantity of crude oil used in the production of each of these refined oils is included in the figure of crude consumed. The data for the factory production, factory consumption, imports, exports and factory and warehouse stocks of fats and oils and for the raw materials used in the production of vegetable oils for the three-month period appear in the following statement.

Production, Consumption, and Stocks  
of Fats and Oils

(In some cases, where products were made by a continuous process, the intermediate products were not reported.)

Kind	Factory operations for the Quarter ended Sept. 30, 1931 Production (pounds)	Consumption (pounds)
<b>VEGETABLE OILS: (1)</b>		
Cottonseed, crude.....	160,983,737	99,470,896
Cottonseed, refined.....	91,966,959	232,420,109
Peanut, virgin and crude.....	1,134,243	2,357,147
Peanut, refined.....	2,096,240	2,546,232
Coconut, or copra, crude.....	61,387,627	137,729,696
Coconut, or copra, refined.....	68,682,102	78,496,371
Corn, crude.....	25,291,850	25,335,154
Corn, refined.....	21,807,440	6,878,377
Soya bean, crude.....	8,390,902	11,796,177
Soya bean, refined.....	8,667,208	4,977,467
Olive, edible.....	.....	647,838
Olive, inedible.....	.....	2,123,520
Sulphur oil or olive foots.....	.....	10,336,376
Palm-kernel, crude.....	6,463,447	13,120,631
Palm-kernel, refined.....	6,170,308	6,106,041
Rapeseed.....	.....	2,185,900
Linseed.....	141,204,905	70,503,636
Chinese wood or tung.....	.....	18,362,074
Chinese vegetable tallow.....	.....	862,372
Castor.....	12,084,806	4,403,744
Palm.....	.....	54,118,634
Sesame.....	23,839,876	25,751,339
Sunflower seed.....	.....	8,714,481
All other.....	83,487	1,237,812
<b>FISH OILS: (1)</b>		
Cod and cod-liver.....	53,850	3,598,962
Menhaden.....	12,400,943	5,573,640
Whale.....	.....	20,220,987
Herring, including sardine.....	16,049,985	22,292,314
Sperm.....	.....	329,284
All other, (including marine animal).....	1,342,335	481,722
(1) The data of oils produced, consumed, and on hand by fish oil producers and fish cannery were collected by the Bureau of Fisheries.		
<b>ANIMAL FATS:</b>		
Lard, neutral.....	3,173,495	3,332,223
Lard, other edible.....	338,647,943	2,696,288
Tallow, edible.....	21,156,055	25,132,301
Tallow, inedible.....	128,070,946	143,743,715
Neat's foot oil.....	788,956	1,316,423
<b>GREASES:</b>		
White.....	14,028,547	9,844,566
Yellow.....	18,683,243	8,035,887
Brown.....	14,283,514	15,396,254
Bone.....	8,845,865	58,397
Tankage.....	11,363,558	99,375
Garbage or house.....	16,673,411	15,498,204
Wool.....	2,884,833	1,017,252
Recovered.....	645,579	500,594
All other.....	2,647,081	1,490,823
<b>OTHER PRODUCTS:</b>		
Lard compounds and other lard substitutes.....	276,712,700	226,523
Hydrogenated oils.....	140,021,076	130,194,610
Stearin, vegetable.....	2,633,383	4,110,417
Stearin, animal, edible.....	9,486,944	8,056,701
Stearin, animal, inedible.....	2,235,314	3,553,004
Oleo oil.....	23,325,885	11,496,280
Lard Oil.....	5,489,684	2,345,715
Tallow oil.....	2,094,123	3,811,338
Fatty acids.....	32,530,992	34,993,383
Red oil.....	9,582,959	6,009,869

	Current Market	1931		1930		1929	
		Low	High	Low	High	Low	High
Terra Alba Amer. No. 1, bgs or bbls mills.....100lb.	1.15	1.75	1.15	1.75	1.75	1.15	1.75
No. 2 bags or bbls.....100lb.	1.50	2.00	1.50	2.00	2.00	1.50	2.00
Imported bags.....lb.	.01	.01	.01	.01	.01	.02	.01
Tetrachlorethane, 50 gal dr.....lb.	.09	.09	.09	.09	.09	.09	.09
Tetralene, 50 gal drs wks.....lb.	.20	.20	.20	.20	.20	.20	.20
Thiocarbamid, 170 lb bbl.....lb.	.25	.28	.25	.28	.22	.24	.22
Crystals, 500 lb bbls wks.....lb.	.24	.25	.24	.28	.34	.25	.38
Metal Straits NY.....lb.	.22	.23	.22	.27	.38	.26	.48
Oxide, 300 lb bbls wks.....lb.	.26	.25	.29	.42	.25	.50	.42
Tetrachloride, 100 lb drs wks.....lb.	.1695	.1785	.1695	.19	.20	.18	.30
Titanium Dioxide 300 lb bbl.....lb.	.20	.21	.20	.22	.50	.21	.50
Pigment, bbls.....lb.	.06	.07	.06	.07	.07	.14	.07
Toluene, 110 gal drs.....gal.	.35	.34	.35	.40	.35	.45	.45
8000 gal tank cars wks.....gal.	.30	.27	.30	.35	.30	.40	.40
Toluidine, 350 lb bbls.....lb.	.88	.89	.88	.94	.94	.90	.94
Mixed, 900 lb drs wks.....lb.	.27	.32	.27	.32	.27	.32	.31
Toner Lithol, red, bbls.....lb.	.90	.95	.90	.95	.95	.90	.85
Para, red, bbls.....lb.	.80	.80	.80	.80	.80	.80	.70
Toluidine.....lb.	1.50	1.55	1.50	1.55	1.55	1.55	1.50
Triacetin, 50 gal drs wks.....lb.	.32	.36	.32	.36	.32	.36	.32
Trichlorethylene, 50 gal dr.....lb.	.10	.10	.10	.10	.10	.10	.10
Triethanolamine, 50 gal drs.....lb.	.40	.42	.40	.42	.40	.60	.55
Tricresyl Phosphate, drs.....lb.	.26	.35	.26	.45	.45	.33	.45
Triphenyl guanidine.....lb.	.58	.60	.58	.60	.58	.70	.58
Phosphate, drums.....lb.	.50	.65	.50	.70	.70	.60	.75
Tripoli, 500 lb bbls.....100 lb.	.75	2.00	.75	2.00	2.00	1.75	2.00
Tungsten, Wolframite, per unit.....	11.00	11.75	11.00	11.75	.....	.....	.....
Turpentine carlots, bbls.....gal.	.40	.36	.40	.36	.41	.65	.51
Wood Steam dist. bbls.....gal.	.44	.45	.38	.61	.52	.36	.57
Urea, pure, 112 lb cases.....lb.	.15	.17	.15	.17	.15	.30	.15
Fert. grade, bags c.i.f. S. points.....ton	82.60	.....	82.60	108.00	108.00	105.00	98.00
c. i. f. S. points.....ton	82.60	.....	82.60	109.30	109.30	106.30	99.30
Valonia Beard, 42%, tannin bags.....ton	23.00	34.00	33.00	40.00	40.00	39.50	55.00
Cups, 30-31% tannin.....ton	22.50	23.50	22.50	25.00	27.00	24.00	35.00
Mixture, bark, bags.....ton	25.00	26.00	25.00	31.00	32.50	30.00	43.00
Vermillion, English, kegs.....lb.	1.53	1.80	1.53	1.80	2.05	1.75	2.05
Vinyl Chloride, 16 lb cyl.....lb.	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wattle Bark, bags.....ton	32.00	34.50	32.00	41.00	47.75	40.00	49.75
Extract 55%, double bags ex-dock.....lb.	.05	.06	.05	.06	.05	.06	.06
Whiting, 200 lb bags, c-1 wks.....100 lb.	.85	1.00	.85	1.00	1.00	1.25	1.00
Alba, bags c-1 NY.....ton	13.00	.....	13.00	13.00	13.00	13.00	13.00
Gilders, bags c-1 NY.....100 lb.	1.35	.....	1.35	1.35	1.35	1.35	1.35
Xylene, 10 deg tanks wks.....gal.	.29	.....	.29	.31	.28	.33	.33
Commercial, tanks wks.....gal.	.26	.24	.30	.33	.25	.32	.30
Xylidine, crude.....lb.	.36	.37	.36	.37	.38	.37	.38

## Zinc

Zinc Ammonium Chloride powd., 400 lb bbls.....100 lb.	5.25	5.75	5.25	5.75	5.75	5.25	5.75
Carbonate Tech, bbls NY.....lb.	.10	.11	.10	.11	.11	.10	.10
Chloride Fused, 600 lb drs wks.....lb.	.05	.06	.05	.06	.06	.05	.05
Gran., 500 lb bbls wks.....lb.	.05	.06	.05	.06	.06	.05	.06
Sols 50%, tanks wks.....100 lb.	2.25	3.00	2.25	3.00	3.00	2.25	3.00
Cyanide, 100 lb drums.....lb.	.38	.39	.38	.39	.41	.38	.41
Dithiofuroate, 100 lb dr.....lb.	1.00	.....	1.00	1.00	1.00	1.00	1.00
Dust, 500 lb bbls c-1 wks.....lb.	.0535	.0585	.0535	.07	.11	.06	.08
Metal, high grade slabs c-1 NY.....100 lb.	3.55	3.55	4.45	6.45	4.10	6.45	6.45
Oxide, American bags wks.....lb.	.06	.07	.06	.07	.06	.07	.07
French, 300 lb bbls wks.....lb.	.09	.11	.09	.11	.11	.09	.09
Perborate, 100 lb drs.....lb.	1.25	.....	1.25	1.25	1.25	1.25	1.25
Peroxide, 100 lb drs.....lb.	1.25	.....	1.25	1.25	1.25	1.25	1.25
Stearate, 50 lb bbls.....lb.	.18	.22	.18	.23	.26	.20	.26
Sulfate, 400 bbl wks.....lb.	.03	.03	.03	.03	.03	.03	.03
Sulfide, 500 lb bbls.....lb.	.13	.13	.13	.16	.32	.16	.32
Sulfocarbolate, 100 lb kegs.....lb.	.22	.24	.22	.30	.30	.28	.30
Zirconium Oxide, Nat. kegs.....lb.	.02	.03	.02	.03	.03	.02	.03
Pure kegs.....lb.	.45	.50	.45	.50	.50	.45	.50
Semi-refined kegs.....lb.	.08	.10	.08	.10	.10	.08	.10

## Oils and Fats

Castor, No. 1, 400 lb bbls.....lb.	.10	.10	.10	.12	.13	.11	.13
No. 3, 400 lb bbls.....lb.	.09	.10	.09	.11	.13	.11	.13
Blown, 400 lb bbls.....lb.	.12	.13	.12	.14	.15	.12	.14
China Wood, bbls spot NY.....lb.	.07	.07	.07	.07	.13	.07	.16
Tanks, spot NY.....lb.	.06	.06	.06	.07	.11	.06	.15
Coast, tanks.....lb.	.05	.06	.05	.06	.10	.05	.14
Cocanut, edible, bbls NY.....lb.	.10	.10	.10	.10	.10	.10	.10
Ceylon, 375 lb bbls NY.....lb.	.04	.04	.04	.06	.08	.06	.09
8000 gal tanks NY.....lb.	.03	.04	.03	.06	.07	.05	.08
Cochin, 375 lb bbls NY.....lb.	.05	.06	.05	.07	.09	.07	.10
Tanks NY.....lb.	.04	.05	.04	.05	.08	.07	.09
Manila, bbls NY.....lb.	.04	.05	.04	.07	.08	.06	.09
Tanks NY.....lb.	.04	.03	.05	.07	.05	.08	.06
Tanks, Pacific Coast.....lb.	.03	.03	.05	.07	.05	.08	.06

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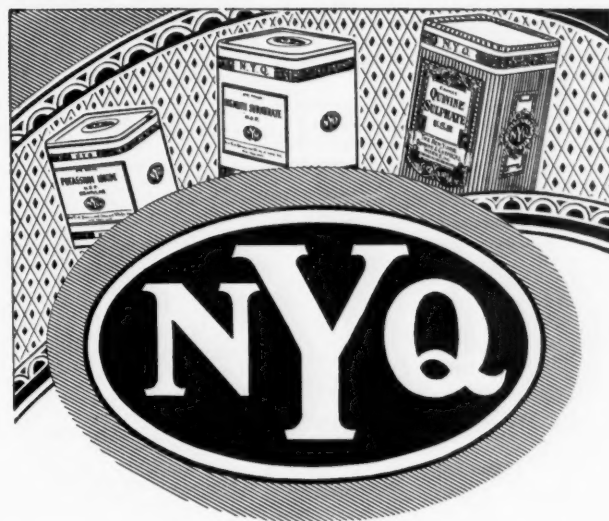
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## Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—\$1.00 - 1930 Average \$1.161 - Jan. 1930 \$1.072 - Nov. 1931 \$1.463

Stearic acid.....	6,047,948	2,241,229
Glycerin, crude 80 per cent basis.....	35,085,281	33,269,950
Glycerine, dynamite.....	9,912,806	5,137,389
Glycerine, chemically pure.....	16,729,583	2,237,246
Cottonseed foots, 50 per cent basis.....	15,833,502	25,791,599
Cottonseed foots, distilled.....	19,171,389	20,451,531
Other vegetable oil foots.....	13,383,030	11,818,847
Other vegetable oil foots distilled.....	1,016,009	1,753,964
Acidulated soap stock.....	7,937,202	9,785,354
Miscellaneous soap stock.....	377,027	421,157

## Raw Materials Used in the Manufacture of Vegetable Oils

Kind	Consumed June 30 to Sept. 30	On hand Sept. 30
Tons of 2,000 pounds		
Cottonseed.....	531,896	484,374
Peanuts, hulled.....	1,644	609
Peanuts, in the hull.....	32	174
Copra.....	49,024	23,795
Cocoanuts and skins.....	468	30
Corn germs.....	50,845	316
Flaxseed.....	213,083	118,760
Castor beans.....	13,313	5,930
Mustard seed.....	208	1,014
Soya beans.....	29,216	14,805
Sesame.....	25,090	6,309
Other kinds.....	7,295	3,721

## Imports of Foreign Fats and Oils, Quarter Ended September 30, 1931

Kind	Pounds
Animal oils and fats, edible.....	815,036
Whale oil.....	272,152
Cod oil.....	2,704,342
Cod-liver oil.....	3,417,465
Other fish oils.....	9,431,655
Tallow.....	260,556
Wool grease.....	1,252,013
Oleic Acid or Red oil.....	237,305
Stearic acid.....	1,847,744
Grease and oils, n.e.s. (Value).....	\$23,312
Olive oil, edible.....	20,338,214
Peanut oil.....	6,217,426
Sunflower seed oil.....	1,719,451
Palm oil.....	62,568,038
Other edible vegetable oils.....	4,952,738
Tung oil.....	24,479,881
Cocoon oil.....	82,527,339
Sulphur oil or olive foots.....	12,204,317
Other olive oil, inedible.....	3,075,755
Palm-kernel oil.....	3,963,992
Sesame oil.....	344
Cornuba wax.....	649,534
Other vegetable wax.....	793,814
Rape (colza) oil.....	1,552,792
Linseed oil.....	9,980
Soya bean oil.....	1,449,055
Perilla oil.....	4,392,010
Other expressed oils.....	443,518
Glycerine, crude.....	2,295,955
Glycerine, refined.....	203,262

## Exports of Foreign Fats and Oils, Quarter Ended September 30, 1931

Kind	Pounds
Animal fat and oils, edible.....	82,632
Other animal oils and fats, inedible.....	1,800
Olive oil, edible.....	36,075
Tung oil.....	812,493
Cocoon oil.....	493,524
Palm and palm-kernel oil.....	698,409
Peanut oil.....	490,736
Soya bean oil.....	61,800
Other expressed oils and fats.....	223,816
Vegetable wax.....	85,838
Oleo oil.....	10,234,374
Oleo stock.....	2,482,856
Tallow.....	317,578
Lard.....	106,124,248
Lard, neutral.....	2,024,933
Lard compounds, containing animal fats.....	340,540
Oleo stearin.....	1,619,313
Neat's foot oil.....	288,777
Other animal oils, inedible.....	189,942
Fish oils.....	394,360
Grease stearin.....	699,614
Oleic acid, or Red oil.....	434,003
Stearic acid.....	94,184
Other animal greases and fats.....	18,838,301
Cottonseed oil, crude.....	247,340
Cottonseed oil, refined.....	1,851,555
Cocoon oil, crude.....	4,384,075
Cocoon oil, refined.....	655,583
Corn oil.....	128,350
Soya bean oil.....	1,925,954
Vegetable oil lard compounds.....	1,037,376
Other edible vegetable oils and fats.....	914,580
Linseed oil.....	259,985
Other expressed oils and fats, inedible.....	162,451
Vegetable soap stock.....	5,467,783
Glycerin.....	100,523

	Current Market	Low	1931 High	1930 High	Low	High	1929 Low
Cod, Newfoundland, 50 gal bbls							
Tanks NY.....gal.	.28	.30	.26	.48	.56	.46	.57
Cod Liver see Chemicals.....gal.	.26	.24	.45	.62	.48	.60	.60
Copra, bags.....lb.	.0235	.024	.0195	.0325	.046	.039	.05
Corn, crude, bbls NY.....lb.	.05	.09	.05	.09	.10	.08	.10
Tanks, mills.....lb.	.04	.04	.04	.07	.08	.06	.07
Refined, 375 lb bbls NY.....lb.	.06	.07	.06	.10	.10	.09	.11
Tanks.....lb.	.08	.08	.08	.10	.10	.08	.11
Cottonseed, crude, mill.....lb.	.04	.04	.07	.07	.06	.09	.08
PSY, Oct. 1.....100 lb bbls spot	3.46	4.00					
Degras, American, 50 gal bbl NY.....lb.	.03	.04	.03	.04	.04	.03	.05
English, brown, bbls NY.....lb.	.03	.04	.03	.05	.05	.04	.05
Light, bbls NY.....lb.	.04	.04	.05	.05	.05	.05	.05
Dog Fish, Coast Tanks.....gal.	.32		.32	.34	.32		

## Greases

Greases, Brown.....lb.	.02	.02	.02	.04	.06	.04	.08	.06
Yellow.....lb.	.03	.03	.02	.05	.07	.03	.08	.06
White, choice bbls NY.....lb.	.03	.04	.03	.05	.08	.06	.11	.07
Herring, Coast, Tanks.....gal.	Nom.	Nom.	Nom.	Nom.	Nom.	Nom.	Nom.	Nom.
Horse, bbls.....lb.	.05	.12	.11	.13	.13	.12	.15	.14
Lard Oil, edible, prime.....lb.	.08	.07	.10	.12	.10	.13	.12	.12
Extra, bbls.....lb.	.07	.06	.09	.11	.09	.13	.11	.11
Extra No. 1, bbls.....lb.	.087	.082	.102	.146	.096	.162	.105	.105
Linseed, Raw, five bbl lots.....lb.	.076	.074	.098	.142	.092	.158	.101	.101
Bbls c-1 spot.....lb.	.073	.068	.092	.134	.086	.15	.093	.093
Tanks.....lb.	.17	.20	.14	.22	.50	.21	.52	.45
Menhaden Tanks Baltimore.....gal.	.38	.40	.38	.53	.70	.52	.70	.70
Extra, bleached, bbls NY.....gal.	.33	.34	.33	.38	.64	.36	.64	.63
Light, pressed, bbls NY.....gal.	.36	.37	.30	.42	.67	.38	.67	.66
Yellow, bleached, bbls NY.....gal.								
Mineral Oil, white, 50 gal bbls								
Russian, gal.....lb.	.40	.60	.40	.60	.60	.40	.60	.40
Neatsfoot, CT, 20* bbls NY.....lb.	.95	1.00	.95	1.00	.95	1.00	.95	.95
Extra, bbls NY.....lb.	.13	.14	.13	.16	.17	.16	.19	.18
Pure, bbls NY.....lb.	.07	.07	.07	.10	.11	.09	.13	.12
Oleo, No. 1, bbls NY.....lb.	.09	.09	.09	.12	.13	.11	.15	.13
No. 2, bbls NY.....lb.	.07	.06	.08	.12	.08	.11	.10	.10
No. 3, bbls NY.....lb.	.07	.05	.08	.11	.08	.11	.10	.10
Olive, denatured, bbls NY.....gal.	.06	.65	.72	.80	1.00	.70	1.40	1.05
Edible, bbls NY.....gal.	1.65	2.00	1.50	2.00	2.00	1.75	2.00	1.95
Foots, bbls NY.....lb.	.04	.05	.04	.06	.08	.06	.11	.08
Palm, Kernel, Casks.....lb.	.04	.04	.04	.06	.08	.06	.09	.08
Lagos, 1500 lb casks.....lb.	.04	.05	.04	.06	.07	.05	.09	.07
Niger, Casks.....lb.	.03	.04	.03	.05	.07	.05	.08	.07
Peanut, crude, bbls NY.....lb.	.03	.04	.03	.05	Nom.	Nom.	Nom.	Nom.
Refined, bbls NY.....lb.	.08	.09	.08	.14	.15	.12	.15	.14
Perilla, bbls NY.....lb.	.06	.07	.06	.11	.14	.10	.20	.15
Tanks, Coast.....lb.	.05	.05	.05	.09	.11	.08	.15	.13
Poppyseed, bbls NY.....gal.	1.70	1.75	1.70	1.75	1.75	1.70	1.75	1.70
Rapeseed, blown, bbls NY.....gal.	.68	.70	.68	.73	1.00	.74	1.04	1.04
English, drms. NY.....gal.	.75	.75	.75	.82	.75	.90	.82	.82
Japanese, drms. NY.....gal.	.56	.58	.56	.58	.70	.56	.88	.72
Red, Distilled, bbls.....lb.	.07	.07	.07	.09	.10	.08	.11	.10
Tanks.....lb.	.06	.06	.08	.09	.07	.10	.09	.09
Salmon, Coast, 8000 gal tks.....gal.	.19	.19	.22	.44	.42	.44	.42	.42
Sardine, Pacific Coast tks.....gal.	.17	.17	.19	.42	.18	.51	.45	.45
Sesame, edible, yellow, dos.....lb.	.08	.09	.08	.10	.12	.09	.12	.11
White, dos.....lb.	.10	.11	.10	.12	.12	.10	.12	.12
Sod, bbls NY.....gal.	.40		.40	.40	.40	.40	.40	.40
Soy Bean, crude.....lb.	.03	.04	.03	.08	.09	.07	.10	.09
Pacific Coast, tanks.....lb.	.06	.05	.07	.08	.07	.10	.08	.08
Domestic tanks, f.o.b. mills, Crude, bbls NY.....lb.	.51	.06	.05	.08	.10	.10	.12	.11
Tanks NY.....lb.	.065	.07	.065	.08	.09	.09	.11	.10
Refined, bbls NY.....lb.	.058	.06	.058	.09	.13	.13	.13	.13
Sperm, 38* CT, bleached, bbls NY.....gal.	.68	.70	.68	.85	.85	.84	.85	.84
45* CT, bleached, bbls NY.....gal.	.63	.65	.63	.80	.80	.79	.80	.79
Stearic Acid, double pressed dist bags.....lb.	.08	.09	.08	.11	.15	.13	.18	.15
Double pressed saponified bags.....lb.	.08	.09	.08	.12	.15	.14	.19	.15
Triple, pressed dist bags.....lb.	.11	.11	.11	.14	.17	.15	.20	.17
Stearine, Oleo, bbls.....lb.	.07	.07	.08	.09	.08	.12	.09	.09
Tallow City, extra loose.....lb.	.03	.02	.04	.07	.04	.08	.07	.07
Edible, tierces.....lb.	.04	.04	.06	.09	.05	.10	.08	.08
Tallow Oil, Bbls, c-1 NY.....lb.	.07	.07	.08	.11	.08	.12	.10	.10
Acidless, tanks NY.....lb.	.07	.09	.07	.09	.10	.08	.11	.09
Vegetable, Coast mats.....lb.	.06	Nom.	.06	Nom.	.06	Nom.	.08	.08
Turkey Red, single bbls.....lb.	.07	.09	.10	.12	.10	.12	.11	.11
Double, bbls.....lb.	.09	.11	.10	.16	.13	.16	.14	.14
Whale, bleached winter, bbls NY.....gal.	.74		.74	.74	.74	.80	.74	.74
Extra, bleached, bbls NY.....gal.	.58	.60	.58	.77	.76	.76	.82	.76
Nat. winter, bbls NY.....gal.	.53	.55	.53	.72	.73	.73	.78	.73

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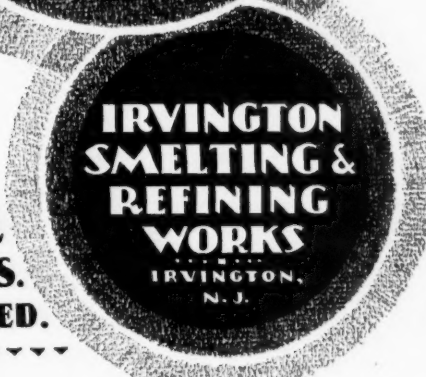
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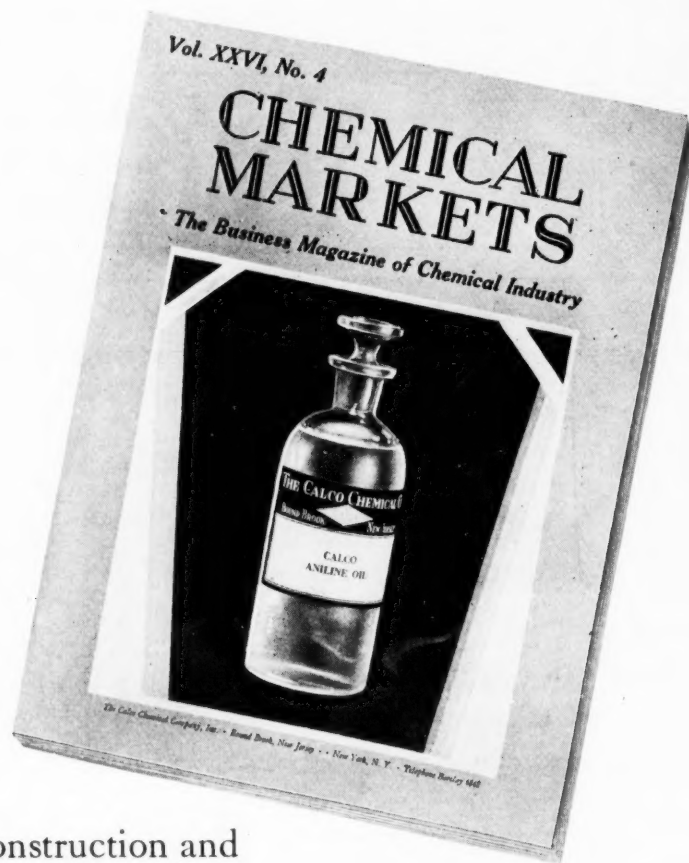
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**CHEMIST** highly trained, development work and plant experience: expert on intermediates, dyes, synthetic chemicals and textile specialties; has new formulas for celanese colors, metachrome colors and other paying propositions; wants connection. Box 936 CHEMICAL MARKETS.

College graduate, B. S. in Chemistry, sales experience, wishes position with chemical concern as laboratory assistant or sales representative. References. Box 940, CHEMICAL MARKETS.

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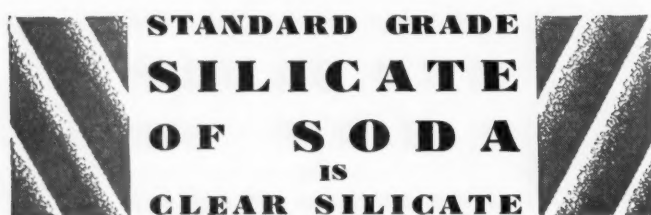
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## "We"—Editorially Speaking

Edison anecdotes are quite the rage: so here goes for one quite out of the ordinary laudatory run. A chemist, discussing the famous golden rod experiments with their distinguished perpetrator asked if he had exhausted the chemical possibilities of rubber synthesis.

"What about iso-perme?" he shouted.

"Eh?" grunted Edison, cupping his ear.

"Iso-perme!" yelled the chemist.

"Is it in Eastman's catalog?"

"I think so" with a vigorous nod of the head.

"No use!" answered the sage of Menlo, "I've tried everything in Eastman's catalog."

That clever pharmacist down in Norfolk, Va. who advertised "Bankrupt Sale of Thriving Drug Business" has a bright kid brother reporting chemicals on one of the weekly trade papers. He wrote recently—"The better tone of demand was ably sustained by generous offerings from second hands".

Here is a compliment what is a compliment!

Teddy of the Chemist's Club stopped us at the checkroom counter to ask "What

was in the November issue of *CHEMICAL MARKETS*? I've put three copies in the magazine rack in the lounge and they've all disappeared."

We promised him another copy, and he confessed, "You know there are three magazines I just can't keep the members from borrowing — 'Chemical Markets,' 'Fortune,' and 'Ballyhoo'!"

Directors of International Nickel show a fine appreciation of that fashionable form of research which devotes itself to finding new uses when they declare a dividend of a nickle a share. This magnificent accomplishment deserves the recognition of one of our scientific societies with a medal of some sort. And if it could be proved that they are responsible for the reincarnation of the five-cent cigar—well, we'd vote them the next Noble Prize.

Knowing where his endowments come from, President Baker of the University of Pittsburgh has been tireless in promoting serious confabs of bituminous bigwigs to help his Trustees and their poor relations make a little more money out

of coal. With what dismay then must the results of the last conference be read all through the hills of western Pennsylvania. For one paper suggesting ways of extending the uses of coal; three papers suggested ways of saving the coal now being used!

Recently there was a rather disastrous waterfront fire "over on the Jersey side". While watching its oily smoke drift idly across the autumnal sky we were rudely called from the window to answer the telephone. An agitated voice inquired whether potassium borate is explosive. We replied that we did not think so; and suggested that as the borate of potassium is not a common chemical of commerce that possibly our inquiring friend meant potassium chlorate.

"I do: is it?" with great emphasis on the "it".

"It is!" with proper emphasis on the "is".

Bing! went the receiver in our ear.

And we've been wondering since whether it was a fireman, a reporter, an insurance agent, or merely an innocent bystander.

### Coming Features

We have been urged to repeat in the January issue the practice of giving *CHEMICAL MARKETS*' readers a symposium of articles on the economic side of the industry in the leading chemical producing countries of the world---what has happened in the past twelve months, and what is likely to occur in the next twelve.

Again M. D. Curwen, Editor, *THE INDUSTRIAL CHEMIST* (London) will report on Great Britain; Dr. W. Roth, Editor, *CHEMIKER-ZEITUNG* (Berlin) will tell us of the most important happenings in Germany; J. Debuigne, Director, *REVUE DES PRODUITS CHIMIQUES* (Paris) will relate the progress France has made chemically in 1931; and a comprehensive review of the American situation by the editorial staff of *CHEMICAL MARKETS*.

"How Have the International Cartels Fared?" Dr. Lewis H. Marks, Alcohol Institute Secretary takes us behind the scenes of the leading international agreements.

"The Truth About Russia." How far has the Soviet progressed chemically in the "Five Year Plan?" D. Lucien Jones, former confidential investigator for Lloyd George, and recently returned from Russia, explains the true conditions in an exclusive article.

Also

Joseph Kalish on "Locating the Chemical Plant"

J. H. McKeon and M. E. Stewart, R. & H., on "Sodium Perborate"

"Shall We Turn to Merchandising Chemicals" by S. L. Willis

